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AUBURN UNIVERSITY

DEVELOPMENT OF ALABAMA RESOURCES INFORMATION SYSTEM ARIS

Final Report

Contract NAS8-30654

SCHOOL OF ENGINEERING

Departments of Industrial Engineering and Mechanical Engineering

Co-Directors

B. E. Herring and R. I. Vachon

Under Contract With

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
NAS8-30654

ALABAMA DEVELOPMENT OFFICE
ALA-AU-X996-1000-6

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DEVELOPMENT OF ALABAMA

RESOURCES INFORMATION SYSTEM

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15 September 1976

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INTRODUCTION

The purpose of this document is to provide a formal, organized set of information concerning the development status of the Alabama Resources Information System (ARIS) as of September 1976 (termination of active NASA financial involvement).

This report includes, as attachments and appendices, the following items:

1. A series of computer source language programs,
2. Flow charts related to each of the computer programs to provide greater ease in performing future change,
3. Listings of the variable names, and their meanings, used in the various source code programs,
4. Copies of the various user manuals which have been prepared through this time.

GROWTH OF ARIS

Earlier reports (ARIS: Alabama Resources Information System, dated 30 June 1974 and Development of Alabama Resources Information System ARIS, dated 1 May 1976) document the early concepts of the system and some of the progress towards a reality of the system.

Figure 1 lists the original (early 1974) set of work elements leading towards the ARIS concept. It is doubtful that any of these elements can be or ever could be deemed completed. In order to provide the State with a truly effective set of computer aided planning procedures, a periodic review of the evolving system should be made by considering these work elements.

Figure 1: Work Elements

1. To participate in joint analysis and/or to do separate analysis of the land use mapping and data prepared by various organizations, including but not limited to:

    a. USDA (MYADS Program)
    b. NASA (ERTS Program)
    c. USDI (RALI Program)
    d. RPDC (Various programs)
    e. ORNL (Various programs)

2. To support State Planning Agency activities to update, identify and fill in data gaps and revise inventories of environmental, geological, and physical conditions which influence the desirability of various types of land use.
3. To support State Planning Agency efforts to identify areas with general limitations for development; i.e., based on soil composition, slope, flood plain, proximity to unique or fragile environment, etc.

4. To support State Planning Agency efforts to analyze the efforts of other states and their land use system development to help insure that Alabama develops a system capable of meeting current and projected data processing needs.

5. To support State Planning Agency efforts to analyze data needs for land use planning and computer storage, retrieval and manipulation of data.

6. To support State Planning Agency efforts in system development, data input procedures, and demonstration activities.

7. To place system development emphasis in at least two (2) demonstration areas within the State of Alabama.

8. This effort will be the initial step toward an earth resources information management system for Alabama which will be developed through the cooperation of the State Planning Agency, Auburn University, and NASA.

Figure 2 illustrates the addition of several more specific work elements which accompanied an extension of the contracts for ARIS development. These latter elements have been essentially completed. The first work element has been temporarily resolved by basing the ARIS processing at Auburn University. It is expected a more permanent base will result from computer system consolidation efforts being made by the State. The second work element was somewhat revised by agreements and contracts with the Alabama Development Office (ADO) whereby ADO has served as the finder/supplier of data and the contractor has provided system development and processing. It is expected that work element three will be satisfied with the submission and acceptance of this document.

The fourth work element was satisfied by State purchase of the spatial or geographic information processing software from the Environmental Systems Research Institute (ESRI) of Redlands, California. It should be noted that this acquired software is essentially identical to that in use by the State of Maryland. Recent Department of the Interior review of existing spatial information processing systems resulted in the statement, "The Maryland Automated Geographic Information System (MAGI) has the most comprehensive capability in existence for statewide manipulation of spatial data." The same statement can be properly made concerning ARIS. Completion of the last work element is an option with MSFC. On-site reviews have been made by MSFC personnel in the past. Future visits are more than welcome as much pride exists concerning accomplishments to date.

Figure 2: Work Elements

1. The contractor will work with the Alabama Development Office and other State offices with the goal of identification of a state-owned or leased and operated computer system which could be used for operational implementation of ARIS after this contract and NASA's direct support has terminated. The milestone for accomplishment of the transfer to State operation will be July 31, 1976.

2. The contractor will be responsible for obtaining actual resource information on the Initial Test Site (as defined in Item 5 of the original Work Statement); and encoding it into the ARIS memory.

3. The contractor will assign highest priority toward the transfer of the ARIS from NASA support to State of Alabama support by the Milestone date of July 31, 1976. Full documentation will be furnished in two copies: a reproducible set to MSFC and a set to the Alabama Development Office.

4. The contractor shall acquire geographic information system software programs together with documentation, provide related user training and adapt the software for use on the contractor's IBM 370/155 computer.

5. The contractor-developed ARIS Computer System will be subjected to final acceptance inspection by MSFC at the contractor's facility.

Since this report is relatively voluminous, copies of previously submitted final version documentation is not included. Documentation and listings of the software acquired from ESRI have previously been submitted and are not included in this report.

Figure 3 contains a list of the work elements which led to the development of the census based portion of ARIS. The requirements dealing with the population and housing information processing procedures were actually separate sets of tasks. Because of their similar natures and task wording, they have been combined in the figure. The census based portion of ARIS, which is called ARISCENS, is tabulation rather than spatially oriented. While the recording of census material is keyed to geographic areas, unless a homogeniety of population distribution is assumed, a truly spatial arrangement is not particularly suitable.

Figure 3: Work Element Description

1. General Objectives

   The general objective of this project is to develop a computer operated data retrieval system utilizing the 1970 U.S. Census of Population Summary Tapes and the 1970 U.S. Census of Housing Summary Tapes. In brief, this system must access the 1970 U.S. Census of Population 4th Count Summary Tape, Population, File B, and the 1970 U.S. Census of Housing 4th Count Summary Tape, Housing, File B; display and aggregate data for specific Census County Divisions; and search the file for CCD(s) with specific data characteristics. This system is described further in 2 and 3 below.

2. The Data File

   The data file will consist of the U.S. Census of Population 4th Count Summary Tape, Population File B, which contains over 1,000 data items in 99 separate Tabulations for each of the 450 Census County Divisions in Alabama and the U.S. Census of Housing 4th Count Summary Tape, Housing File B, which contains data items in 158 separate Tabulations for each of the county census divisions. Descriptions of contents of these Summary Tapes can be found in 1970 Census User's Guide: Part II, U.S. Bureau of the Census, U.S. Government Printing Office.

3. The Program

a. Functions

The program developed to access the data file must perform the following functions:

(1) Display in standard tabular form with appropriate geographic codes, titles, row and column headings, the data items in any Tabulation in the data file for any CCD.

(2) Aggregate across any number of specified CCDs, the data items in any Tabulation. Display should be in standard tabular form and contain the geographic codes of those CCDs comprising the aggregation.

(3) Search the data file for those CCDs in which specific data items, expressed as a percent of the base population, exceed a value assigned by the individual user. The display will contain the title of the data item searched for, the value assigned, the geographic codes of those CCDs meeting or exceeding the assigned value, and the value of the data item for each CCD. EXAMPLE:

Persons 65 Years Old and Over as Percent of All Persons
CCDs with 8.5% or More

CCD Code	Percent
001 005	8.7
017 020	9.6
023 015	9.5
105 005	8.5

b. Users

It is intended that this system be used by persons with little or no knowledge. Thus, the program in final development must be simple to use via remote batch entry terminal. Installation of the product programs on an interactive remote terminal is to be accomplished after ARIS hardware is acquired and under funding of the ARIS contracts.

The documentation included as a part of this report completes the work elements set forth in Figure 3. The ARISCENS software is the only ARIS software completely developed by the contractor. While some minor and experimental geographic software were locally developed, the usual spatially oriented processing procedures were acquired. An example of minor geographic software is the procedure under development to convert an acquired data base which contains terrain elevation data to a format acceptable for input to the ARIS data base. It is expected that several similar software tasks will emerge as data base acquisition efforts continue. Only minor, user-oriented instructional documentation will accompany development of these procedures.

ARIS DOCUMENTATION

A set of eight programs was necessary to the preparation and processing of the ARISCENS data bases. Six of the eight programs were of a single use nature and related to data base and headings file creation. These six will receive future use if the 1980 U.S. Census produces fourth count summary file structures and table heading files identical to those for the 1970 U.S. Census. Should any changes occur in the 1980 and later census output structure, these six programs must be revised or rewritten. Since their existence is key to the creation and use of future census data bases, full documentation of these items of software has been performed and included in this report. Appendix A contains a listing of the variable names (and their definitions) used in these six single use ARISCENS procedures. This appendix also contains flow diagrams and source code listings for the same programs. The six single use programs and their functions are:

1. CREATE_ISAM4BP. This program creates an Indexed Sequential Access Method (ISAM) data base containing population data.

2. CREATE_ISAM4BH. This program creates an ISAM data base containing housing data. Since this program and the previous program (1) are essentially identical, only a single flow diagram is included in the appendix.

3. CENSHEAD. This program creates an ISAM data file containing table headings for editing and describing output from the population data base.

The next three programs deal with output headings for the housing data base. Because of significant peculiarities in the heading data base, two major preliminary steps were necessary to ready the raw headings for ISAM file structuring.

4. MODIFY_REC. This program segment converted pairs of 80 character records into single 136 character records.

5. FIX_THIS. This program corrected a record sequence flaw discovered in the original census headings file.

6. HOUSHEAD. This program creates an ISAM data file containing table headings for editing and describing output from the housing data base.

The two items of ARISCENS data base processing software are documented in Appendix B. Since the two processing procedures, CENSLIST and HOUSLIST are essentially identical (differ only in output table structure), only a single flow diagram has been included. Appendix B is organized similarly to Appendix A, namely, a listing of the variable names and their definitions, the flow diagram, and finally a source code listing of the software.

Appendix C contains the formal abstract (MSFC Form 2568) for the procedures set forth in Appendix B. Appendix C also contains a listing of the hardware and software (Program Description) necessary for use of the ARISCENS data base processing procedures.

Appendix D is intended to include copies of several system user bulletins published to provide detailed instructions to those using the ARIS procedures. The present set of user instructions are contained in three separate publications. Their titles and purpose are as follows:

1. "An Introduction to ARIS"

   This booklet provides an introductory overview of the ARIS concept. ARIS development has been divided into several stages or phases. An explanation of each is included.

2. "Procedures for the Manual Preparation of ARIS Geographic Data"

   This booklet provides detailed user instructions concerning the many steps necessary for properly encoding material for inclusion in the ARIS geographic data base. In addition, the computer procedures necessary to proper generation of single variable data files are presented.

3. "Use of the ARIS Census Data Base"

   The contents of this booklet complete the documentation of the ARISCENS processing procedures started in Appendices A, B, and C of this report. Complete user/computer interface instructions form the bulk of this booklet. This final documentation includes listings and examples of all necessary job control language steps and instructions, procedures for bringing the data base to an on-line status, instructions for preparing the request sets required to perform table building, table aggregating, and table searching operations, maps and tables showing the location, names and codes of the County Census Divisions in Alabama, and explanations of the user and system error messages which might be received. In short, this booklet represents a complete set of user documentation.

ARIS PRESENTATIONS

Appendix E contains a set of viewgraph or slide masters which can be used to prepare presentations covering the concepts of ARIS. The series of cartoon drawings and other diagrams are intended for use with audiences having general interest in spatial information systems. Detailed information for system users is contained in the published and yet to be published manuals.

FUTURE CONCERNS

Material contained in this and previous reports covers only the start of the ARIS task. Very few data bases exist as of this writing. Much emphasis is yet needed on the collection and encoding of data base material. More work is also required to reach the goal of simplifying the user procedures required

for use of the geographic portion of the system. Real ability in computer use remains a somewhat restrictive prerequisite to proper interaction with the geographic procedures. A need remains for access to an inexpensive digitizer. Manual methods or contracted digitization are and will remain very expensive.

The pessimistic or concerned tone of the previous paragraph should not be used to cast gloom on the ARIS project. Much has been accomplished and is now usable by informed decision-makers. A serious immediate need is that of publicity. The Alabama Development Office is acutely aware of ARIS and is making some use of its potential. They have succeeded in interesting one regional planning authority to prepare data base material for system processing and planning aid. Other planning agencies need to become interested. Auburn's Agricultural Engineering personnel developed an early interest in the system and are building a set of data bases for their needs. ARIS retrieval and modeling procedures will be used for investigating the feasibility of agricultural irrigation in this engineering study. Another possible user is the personnel of the Alabama Criminal Justice Information Center. Demonstration meetings are scheduled to begin shortly.

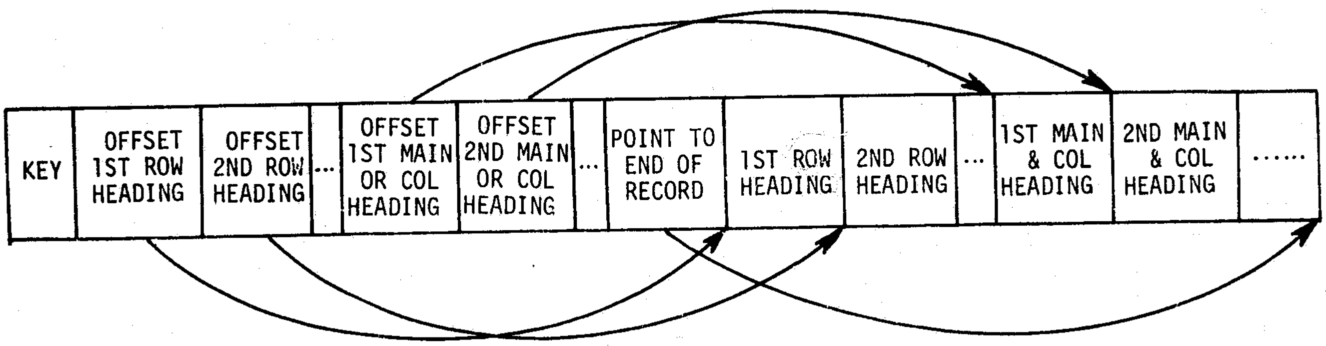
As can be noted, a realization of the ARIS availability and potential is slowly growing. However, this knowledge needs to be disseminated elsewhere, both in and out of Alabama.

APPENDIX A

DOCUMENTATION AND SOURCE CODE LISTINGS FOR SINGLE TIME USE ARISCENS SOFTWARE

OUTLINE OF RECORDS AND VARIABLES FOR HOUSLIST HEADINGS
(MODIFY_REC, FIX_THIS, HOUSHEAD)

Tape IED13, DLIST4H has records which consist of headings for houslist tables. These records are 80 characters long and there are a variable number of records that provide headings for each table. This program takes these many records for each table and condenses them to a single keyed record forming an indexed sequential file on disk (IED13.MHEAD). This Data Set is accessed by a houslist program which creates the (IED13.MHEAD) tables. A record on the readings file takes the form as follows:



Key is the table number.
There is only one record per table.
HEADINGS creates an indexed sequential file.

VARIABLES FOR HOUSLIST HEADINGS

ADDIT: Length of previous record (ROW) needed to add on length of continuation

BLANKS: Total string of blanks to pad heading

COL_OR_ROW: If COL_OR_ROW=0, then record is a main heading or column heading. If COL_OR_ROW=1, then record is a row heading

COLHEAD: String consisting of column heading

CONT: If CONT=1, the next record is a continuation of the previous record

KEYIT: Counter for key to create the indexed sequential date set

L: Length of column, main, or row heading

LEG: Current length of the string of row heading lengths (ROWLEN)

LEN: Total row heading lengths are added to main and column heading lengths

M_C_HEADING: String consisting of main and column headings. All are accumulated here for entire table

M_C_LENGTH: An array which contains the full length of the main and column headings for each part of the table

MEANHEAD: String consisting of the main heading

NEW_OFFSET: Final offset which is concatenated on REDONE

NEWL: Add length from continuing row heading on to previous length

NEXT_OFFSET: Points to next length for addition of RLEN giving offset into the record

NUM_BLANKS: Number of blanks needed to pad the heading to have a length of 132

NUM_OFFSETS: Number of offsets contained in the record

NUM_PARTS: Number of parts or sections in that particular table

OFFSET: Current length which RLEN is added to get NEW_OFFSET

ROWL: Running total of the length of the individual row heading lengths

RECHEAD: Completed record with offsets and headings written on disk (IED13.DHEAD)

RECLEN: String consisting of all lengths of row, main, and column headings

RECORD: Tape input record (IED13,NLIST4H)

REDONE: String of final offsets into the record

RLEN: Length of string of lengths (to be added to each individual length to get offsets into the record)

ROWHEAD: String consisting of cumulative rowheadings

ROWLEN: Cumulative string of row heading lengths

SUPPRESS: Variable used to set a flag so that after row headings are found once, the others will be suppressed (on tape IED13.NLIST4H for each part of the table the row headings occur; in the record we're creating the row headings appear only once)

TABJO: Table number of each heading record on tape IED13.NLIST4H. Every record has a table number and there may be many records per table (on tape IED13.NLIST4H)

VARIABLES FOR CENSLIST HEADINGS (CENSHEAD)

INPUT - the name of the input data set.

HEADINGS - the name of the output data set.

TABLE_KEY - the number of the table for which headings are being created.

MESSAGE - bytes 4 through 79 of the input record.

TYPE - the 80th byte of the input record.

KEY - the table number used as the key to the index sequential file for that table.

LAST_TYPE - the type of the last input record read.

BEGIN - a pointer array indicating the starting position of new lines in the string TEXT.

LINE_COUNT - the number of lines of headings generated for a table.

BLNK - blank characters used to pad the headings.

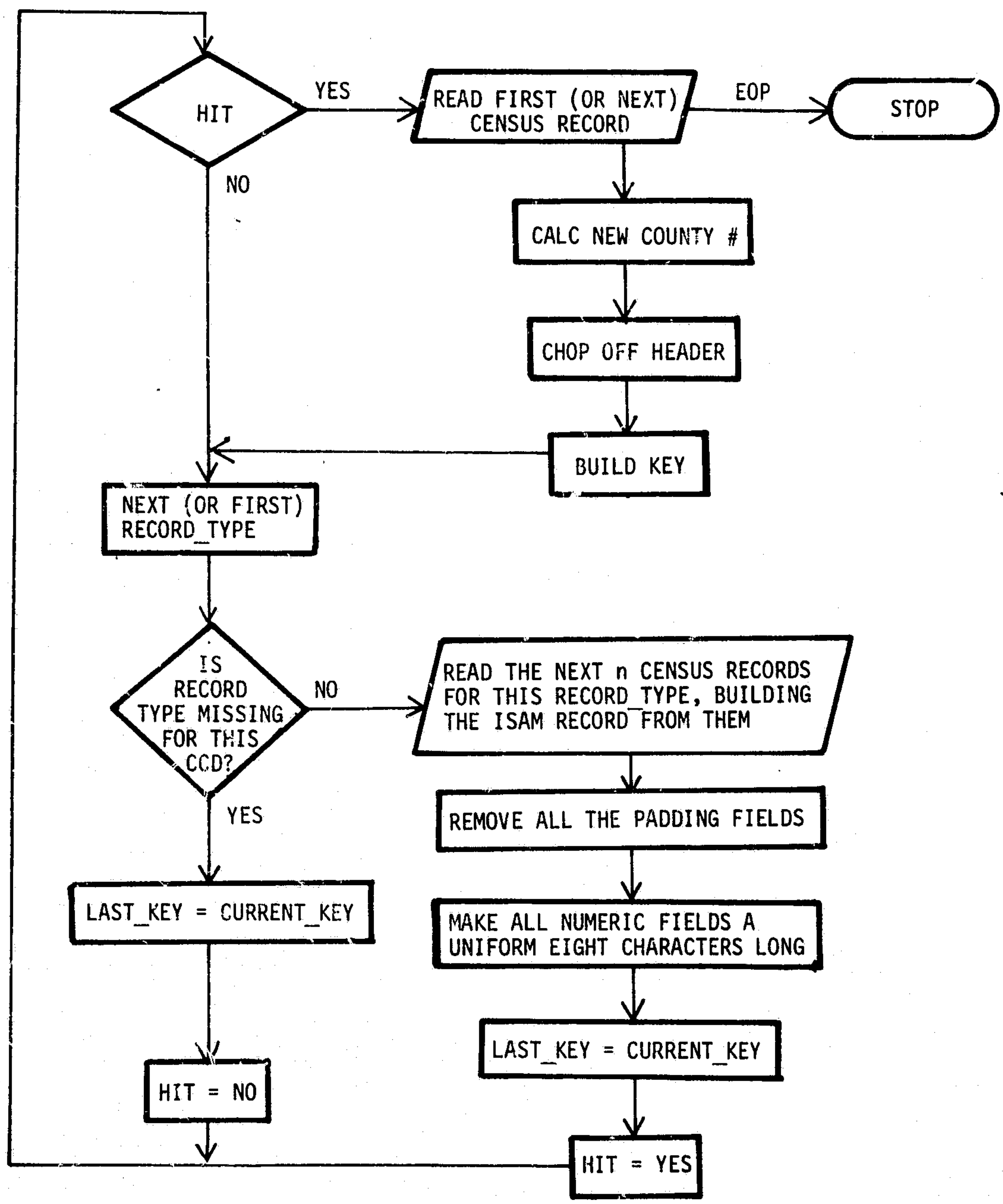
BLANK - blank characters used to pad the headings.

TEXT - the character string into which the headings for a table are stored.

MAX_COLS - the maximum number of output columns available.

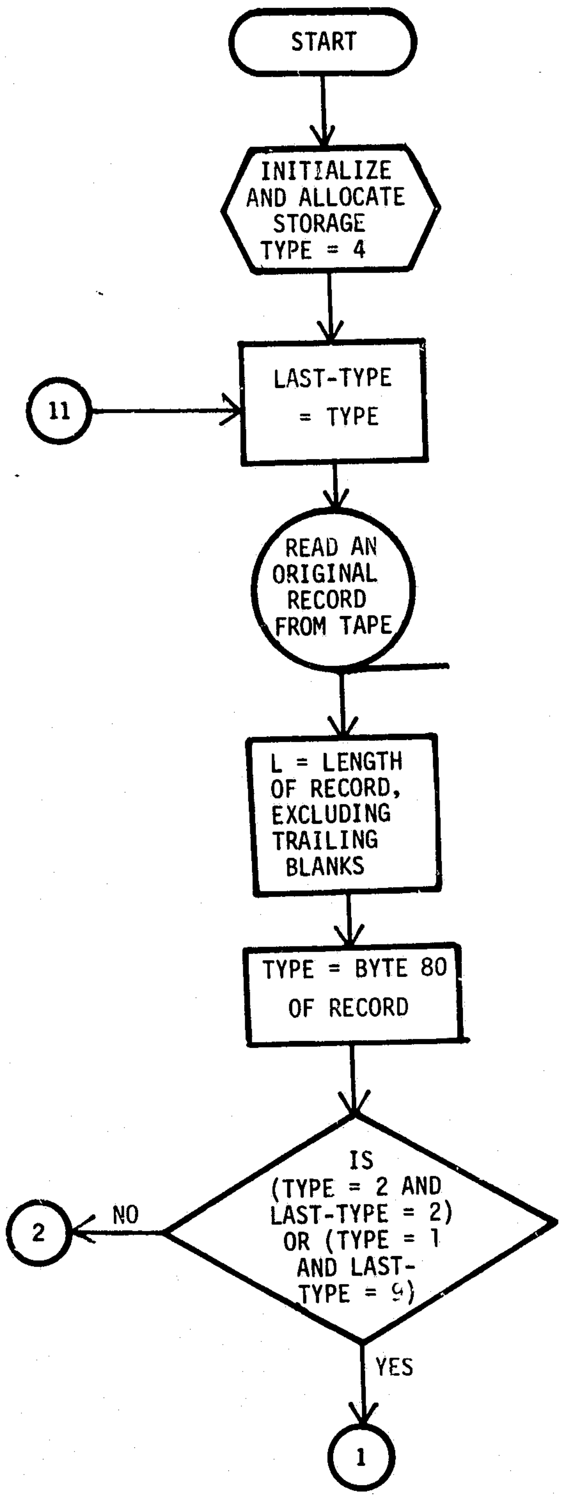
SENTENCE - the complete input record.

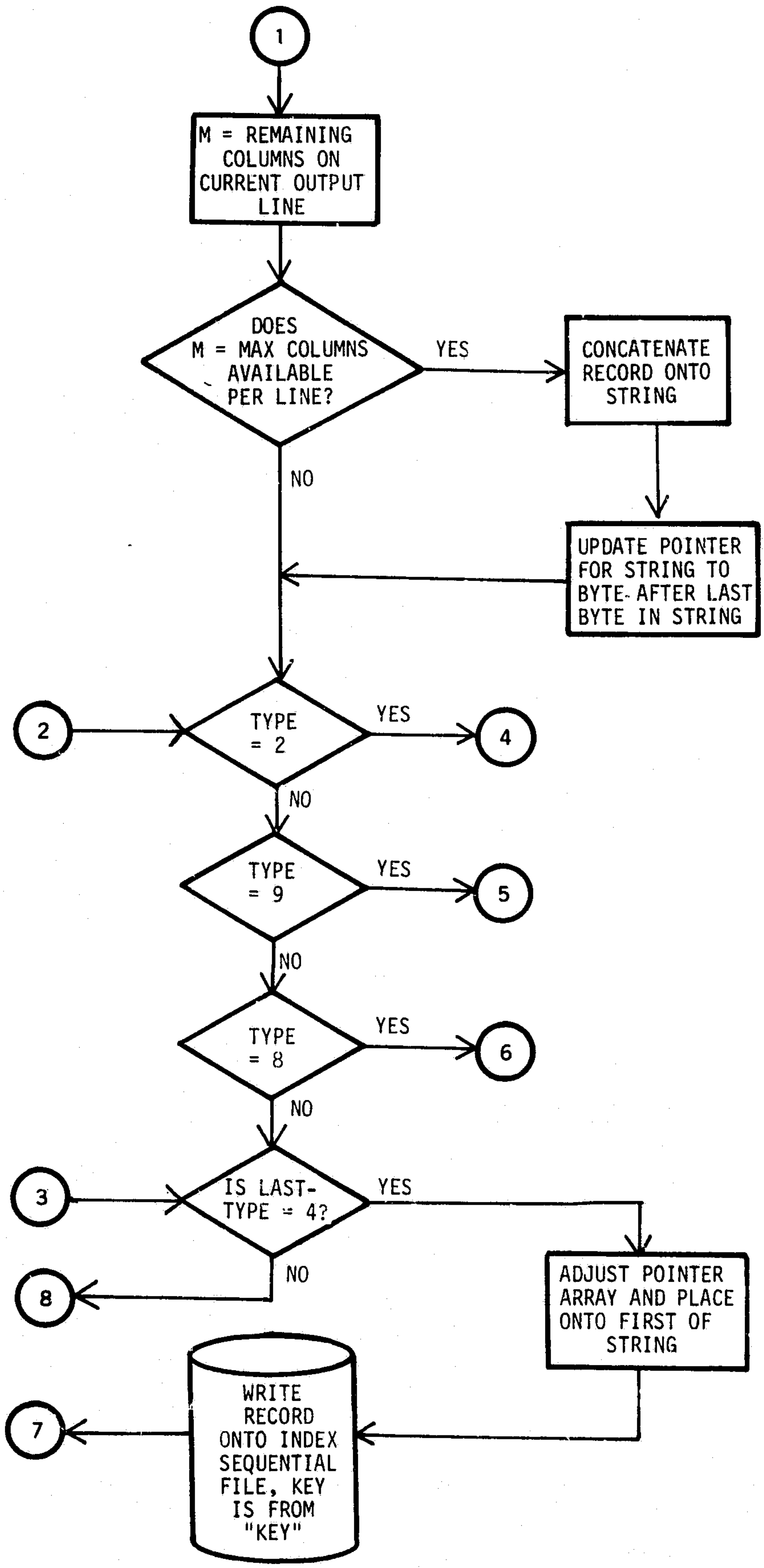
CREATE_ISAM4BH&P:

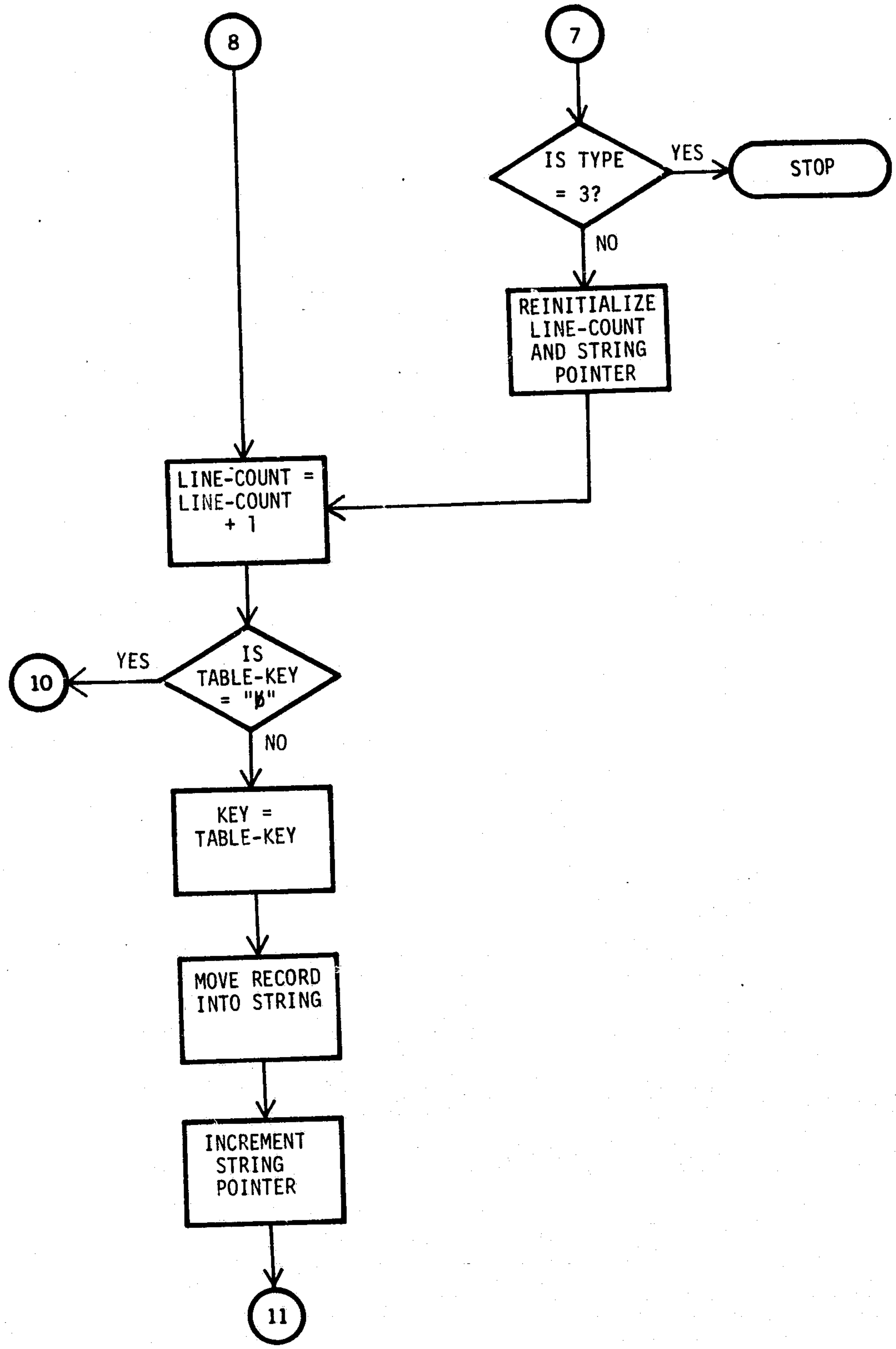


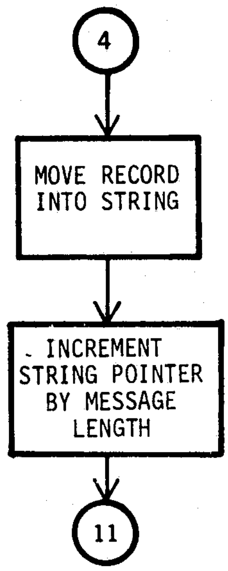
The Census Bureau fourth count data files (both housing and population file B) have data for a single CCD spread over several records. These programs create one (varying length) record for each county-CCD-record type, eliminate padding fields, and make each numeric field a uniform eight characters long.

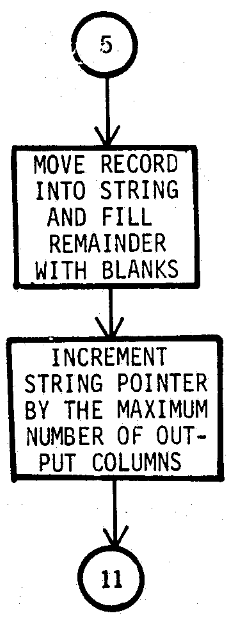
CENSHEAD

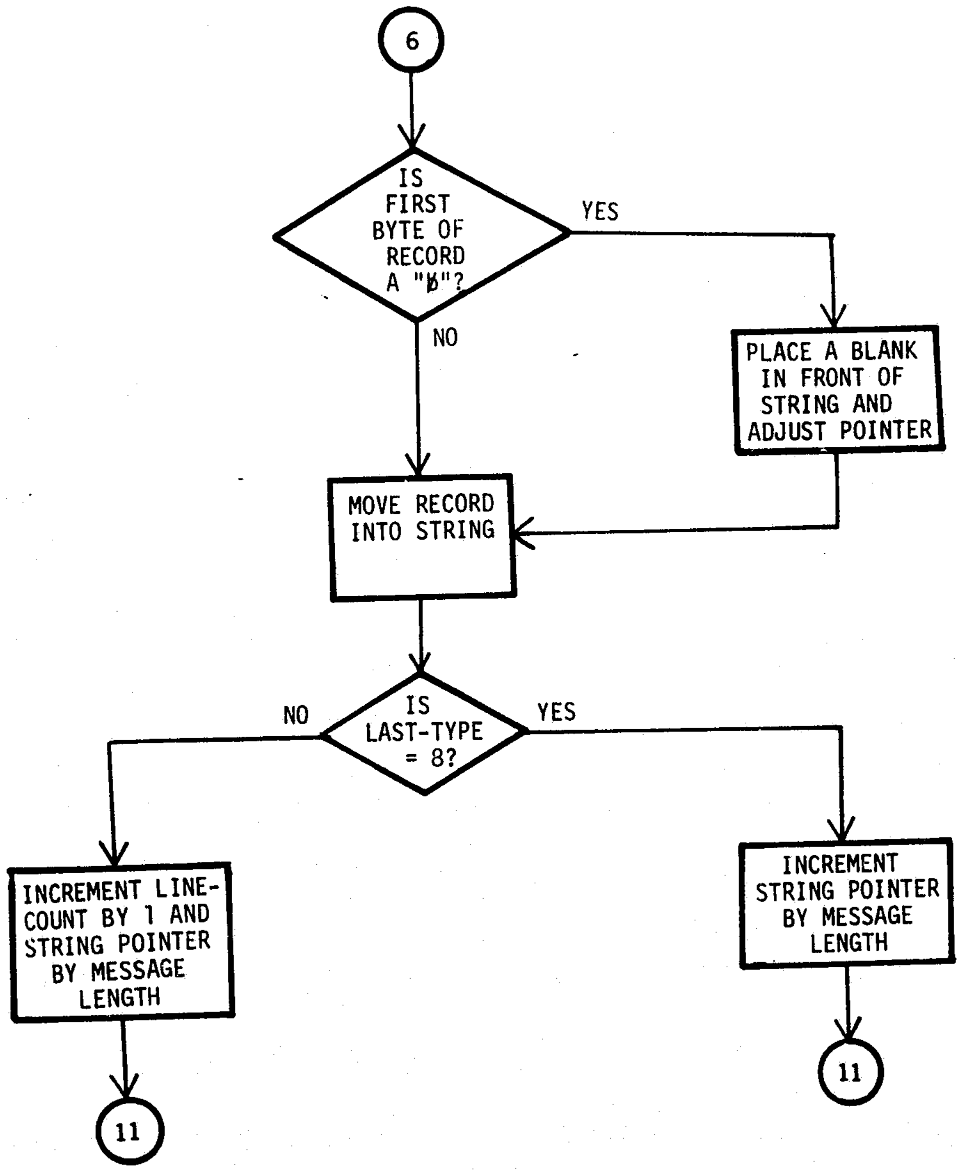

START
INITIALIZE AND ALLOCATE STORAGE TYPE = 4
LAST-TYPE = TYPE
11
READ AN ORIGINAL RECORD FROM TAPE
L = LENGTH OF RECORD, EXCLUDING TRAILING BLANKS
TYPE = BYTE 80 OF RECORD
IS (TYPE = 2 AND LAST-TYPE = 2) OR (TYPE = 1 AND LAST-TYPE = 9)
NO
2
YES
1

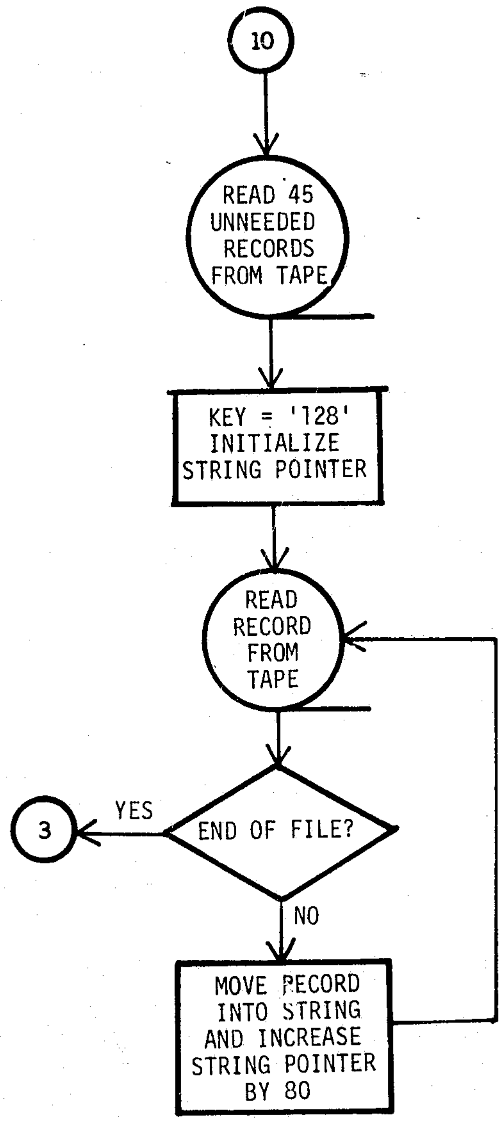

1
M = REMAINING COLUMNS ON CURRENT OUTPUT LINE
DOES M = MAX COLUMNS AVAILABLE PER LINE?
YES
CONCATENATE RECORD ONTO STRING
NO
UPDATE POINTER FOR STRING TO BYTE AFTER LAST BYTE IN STRING
2
TYPE = 2
YES
4
NO
TYPE = 9
YES
5
NO
TYPE = 8
YES
6
NO
3
IS LAST-TYPE = 4?
YES
NO
8
ADJUST POINTER ARRAY AND PLACE ONTO FIRST OF STRING
WRITE RECORD ONTO INDEX SEQUENTIAL FILE, KEY IS FROM "KEY"
7


8
7
IS TYPE = 3?
YES
STOP
NO
REINITIALIZE LINE-COUNT AND STRING POINTER
LINE-COUNT = LINE-COUNT + 1
YES
10
IS TABLE-KEY = "b̸"
NO
KEY = TABLE-KEY
MOVE RECORD INTO STRING
INCREMENT STRING POINTER
11


4
MOVE RECORD INTO STRING
INCREMENT STRING POINTER BY MESSAGE LENGTH
11

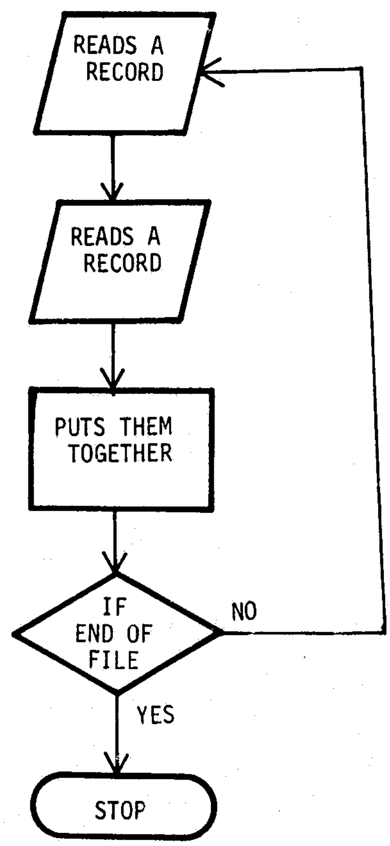

5
MOVE RECORD INTO STRING AND FILL REMAINDER WITH BLANKS
INCREMENT STRING POINTER BY THE MAXIMUM NUMBER OF OUT-PUT COLUMNS
11


6
IS FIRST BYTE OF RECORD A "b̸"?
YES
NO
PLACE A BLANK IN FRONT OF STRING AND ADJUST POINTER
MOVE RECORD INTO STRING
IS LAST-TYPE = 8?
NO
YES
INCREMENT LINE-COUNT BY 1 AND STRING POINTER BY MESSAGE LENGTH
INCREMENT STRING POINTER BY MESSAGE LENGTH
11
11


10
READ 45 UNNEEDED RECORDS FROM TAPE
KEY = '128' INITIALIZE STRING POINTER
READ RECORD FROM TAPE
END OF FILE?
YES
3
NO
MOVE RECORD INTO STRING AND INCREASE STRING POINTER BY 80

PROGRAM MODIFY_REC   1st STEP

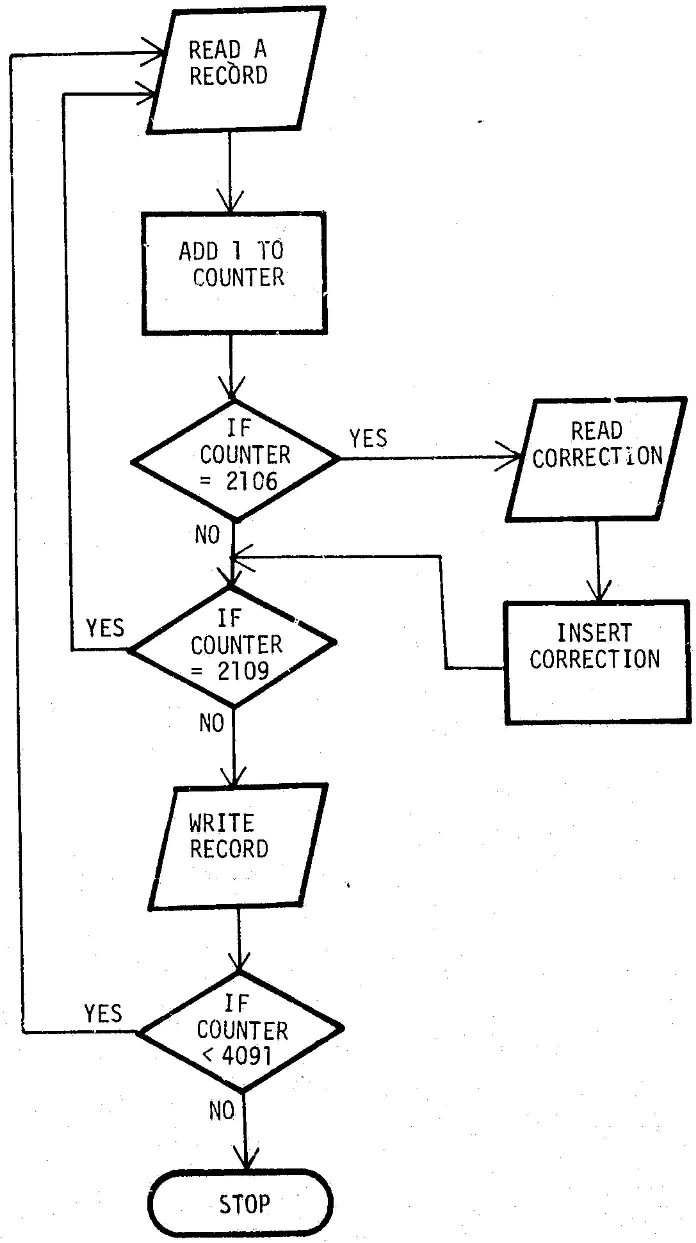
Heading records on the tape (IED13.NLIST4H) are 80 characters long and 2 records are needed to form a usable record. This program reads 2 records and puts them together making one record of a length of 136 characters. This provides easier manipulation for the program that creates the indexed sequential file of headings.



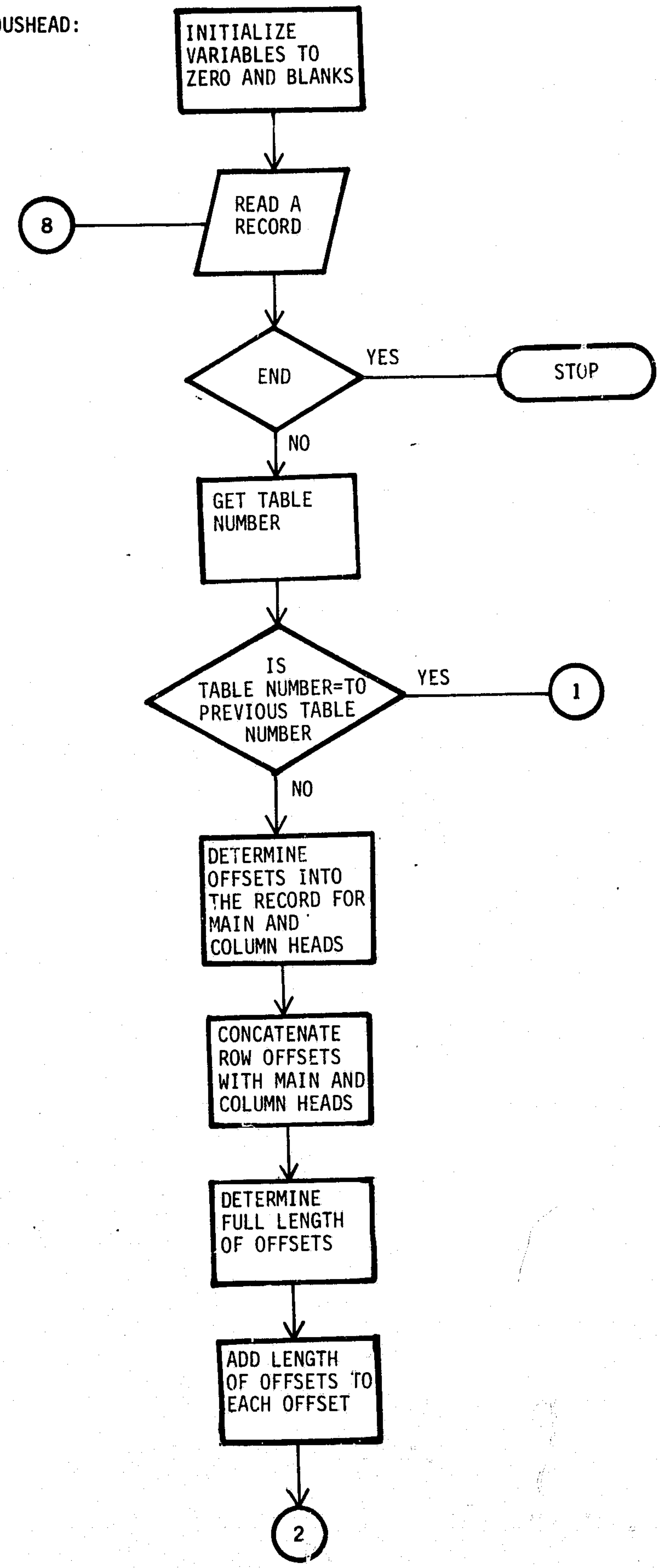
The new file consisting of records with length of 136 is put on a temporary data set and input to the headins program.

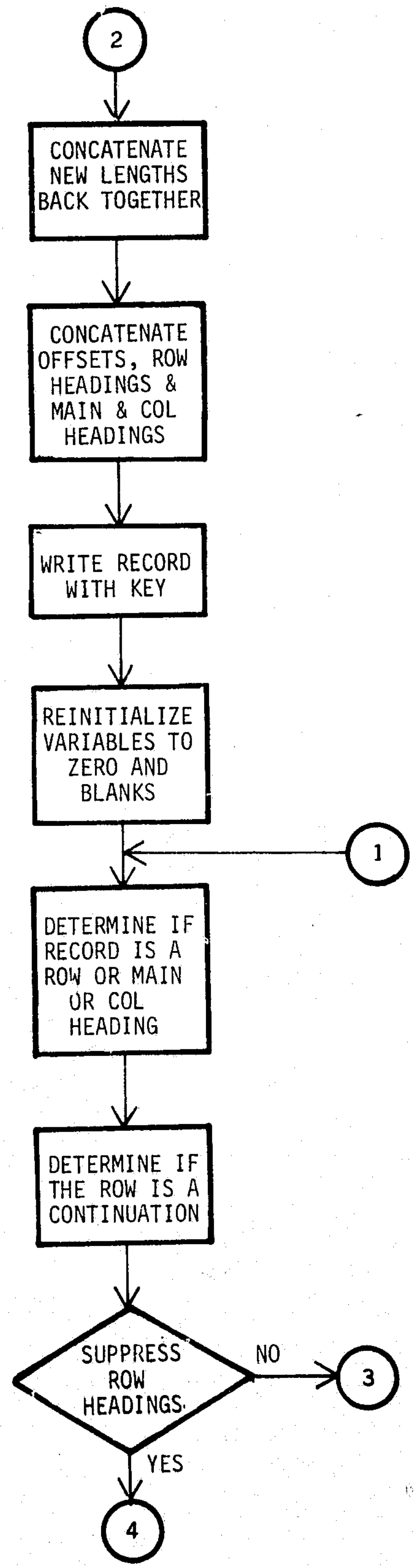
FIX_THIS:

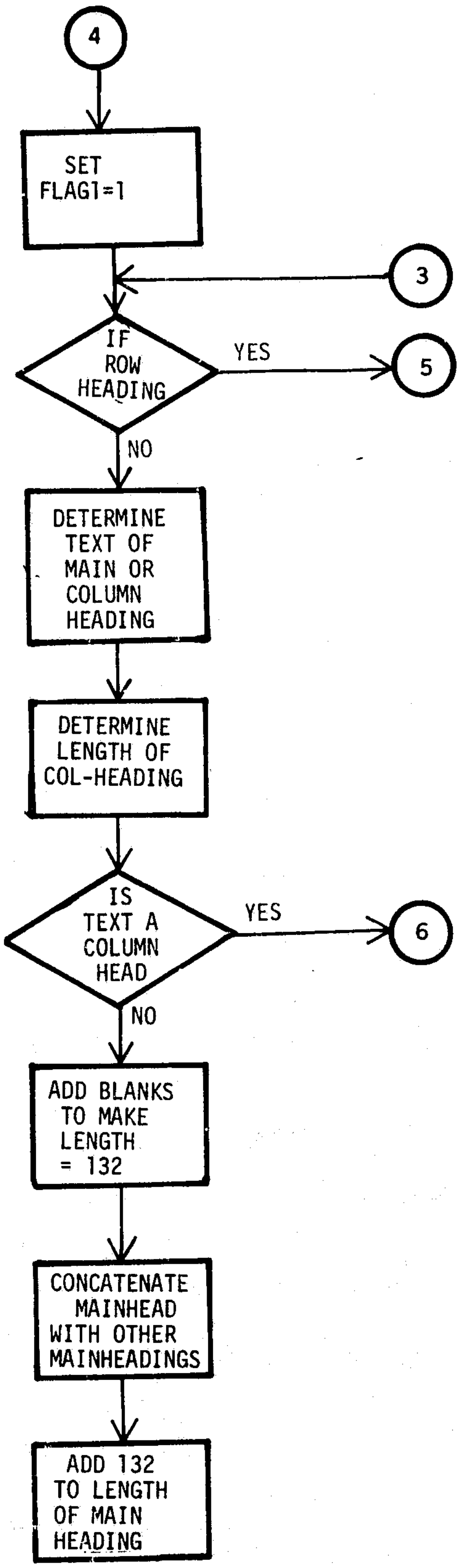
The headings tape data set (IED13.DLIST4H) had a misplaced record. This program corrects the order of the records.

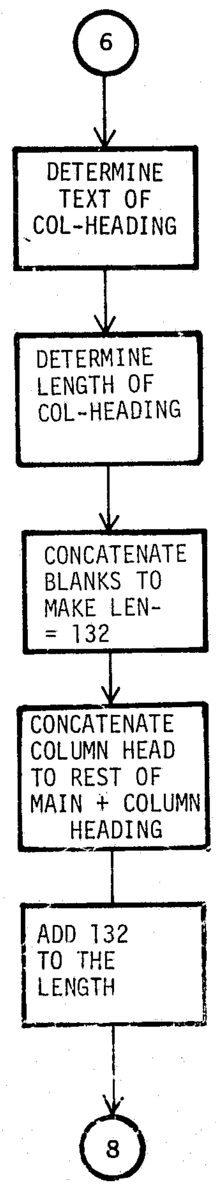


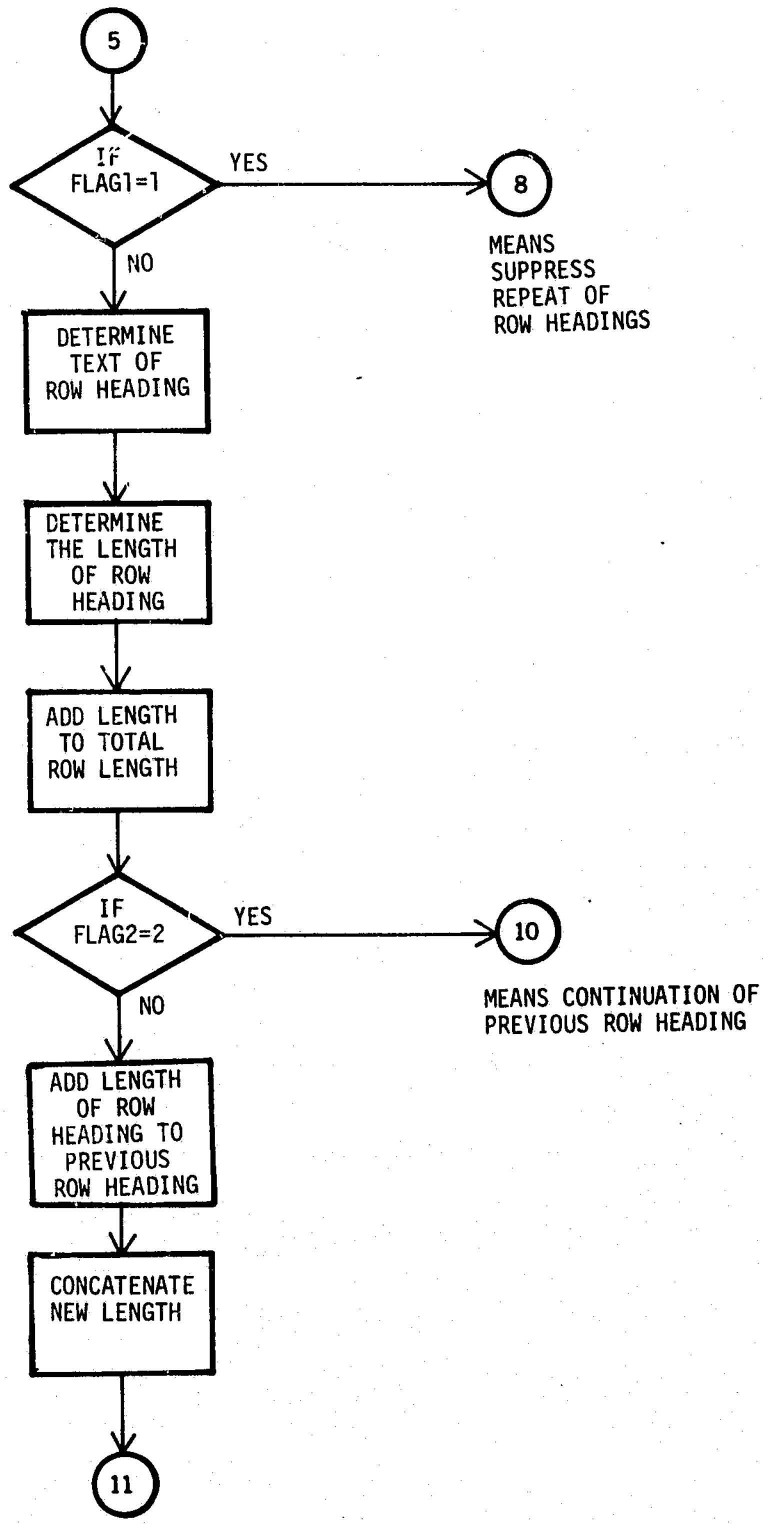
HOUSHEAD:

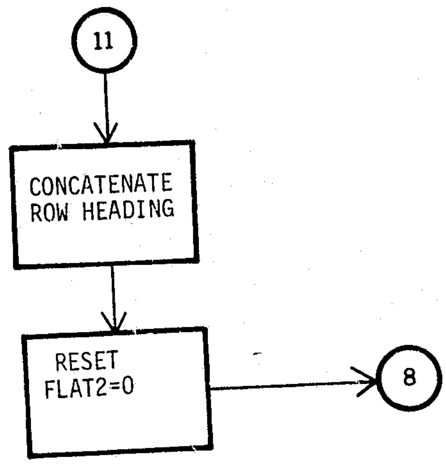

INITIALIZE VARIABLES TO ZERO AND BLANKS
8
READ A RECORD
END
YES
STOP
NO
GET TABLE NUMBER
IS TABLE NUMBER=TO PREVIOUS TABLE NUMBER
YES
1
NO
DETERMINE OFFSETS INTO THE RECORD FOR MAIN AND COLUMN HEADS
CONCATENATE ROW OFFSETS WITH MAIN AND COLUMN HEADS
DETERMINE FULL LENGTH OF OFFSETS
ADD LENGTH OF OFFSETS TO EACH OFFSET
2

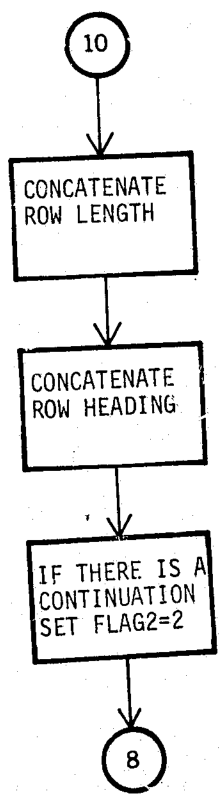

2
CONCATENATE NEW LENGTHS BACK TOGETHER
CONCATENATE OFFSETS, ROW HEADINGS & MAIN & COL HEADINGS
WRITE RECORD WITH KEY
REINITIALIZE VARIABLES TO ZERO AND BLANKS
1
DETERMINE IF RECORD IS A ROW OR MAIN OR COL HEADING
DETERMINE IF THE ROW IS A CONTINUATION
SUPPRESS ROW HEADINGS
NO
3
YES
4


4
SET FLAG1=1
3
IF ROW HEADING
YES
5
NO
DETERMINE TEXT OF MAIN OR COLUMN HEADING
DETERMINE LENGTH OF COL-HEADING
IS TEXT A COLUMN HEAD
YES
6
NO
ADD BLANKS TO MAKE LENGTH = 132
CONCATENATE MAINHEAD WITH OTHER MAINHEADINGS
ADD 132 TO LENGTH OF MAIN HEADING


6
DETERMINE TEXT OF COL-HEADING
DETERMINE LENGTH OF COL-HEADING
CONCATENATE BLANKS TO MAKE LEN- = 132
CONCATENATE COLUMN HEAD TO REST OF MAIN + COLUMN HEADING
ADD 132 TO THE LENGTH
8


5
IF
FLAG1=1
YES
8
MEANS
SUPPRESS
REPEAT OF
ROW HEADINGS
NO
DETERMINE
TEXT OF
ROW HEADING
DETERMINE
THE LENGTH
OF ROW
HEADING
ADD LENGTH
TO TOTAL
ROW LENGTH
IF
FLAG2=2
YES
10
MEANS CONTINUATION OF
PREVIOUS ROW HEADING
NO
ADD LENGTH
OF ROW
HEADING TO
PREVIOUS
ROW HEADING
CONCATENATE
NEW LENGTH
11


11
CONCATENATE ROW HEADING
RESET FLAT2=0
8


10
CONCATENATE ROW LENGTH
CONCATENATE ROW HEADING
IF THERE IS A CONTINUATION SET FLAG2=2
8

ISAM4BP SOURCE LISTING

```
(STRINGRANGE):
CREATE_4BP: PROC OPTIONS(MAIN);
DECLARE ISAM4BP FILE RECORD SEQUENTIAL KEYED ENVIRONMENT(INDEXED),
        (HIT BIT(1) INIT(1B),
        RECORD_TYPE(5) CHAR(2) INIT('01','02','03','04','13'),
        SUBSEQUENT_READS(5) FIXED BIN(17) INIT((4)4,1),
        CHOP_OFF(5) FIXED BIN(17) INIT((4)112,1736),
        TYPE13_PADDING(2) FIXED BIN(17) INIT(2032,2144),
        OTHER_PADDING(8) FIXED BIN(17) INIT(112,224,336,448,560,672,
                                                                784,896),
        (I, J, K) FIXED BIN(17),
        (LAST_KEY,VARY_KEY,DUMMY_KEY) CHAR(7),
        DUMMY_REC BIT(8) INIT((8)'1'B),
        VARY_REC CHAR(10200) VARYING,
        COUNTY PIC'99',
        POP_REC CHAR(2040)) STATIC,
        THEIR_COUNTY PIC'999' DEFINED POP_REC POS(109),
        CCD CHAR(3) DEFINED POP_REC POS(112),
        TYPE CHAR(2) DEFINED POP_REC POS(118);

    ON ENDFILE(COUNT4BP) BEGIN;
                         PUT FILE(SYSPRINT) LIST ('*ISAM4BP CREATED');
                         STOP;
                         END;

    ON ERROR SNAP BEGIN; ON ERROR SYSTEM;
                  PUT FILE(SYSPRINT) LIST(SUBSTR(POP_REC,1,120));
                  PUT FILE(SYSPRINT) DATA(VARY_KEY,LAST_KEY);
                  END;

DO WHILE(1B);
DO J = 1 TO 5;
   IF HIT THEN DO; READ FILE(COUNT4BP) INTO (POP_REC);
                   COUNTY = THEIR_COUNTY / 2 + 1;
                   VARY_KEY = COUNTY||CCD||TYPE;
                   VARY_REC = SUBSTR(POP_REC,121);
                   END;
   IF RECORD_TYPE(J) = TYPE
      THEN DO; DO K = 1 TO SUBSEQUENT_READS(J);
                  READ FILE(COUNT4BP) INTO (POP_REC);
                  VARY_REC = VARY_REC||POP_REC;
                  END;
               IF RECORD_TYPE(J) = '13'
                  THEN DO; DO I = 1 TO HBOUND(TYPE13_PADDING,1);
                              VARY_REC=SUBSTR(VARY_REC,1,
                                                  TYPE13_PADDING(I))
                                ||SUBSTR(VARY_REC,TYPE13_PADDING(I)+9);
                              END;
                           DO I = 2016 TO 2088 BY 8;
```

ISAM4BP SOURCE LISTING

```
                        VARY_REC=SUBSTR(VARY_REC,1,I)||
                                                 SUBSTR(VARY_REC,I+9);
                        END;
                     END;
               ELSE DO; DO I = 1 TO HBOUND(OTHER_PADDING,1);
                        VARY_REC=SUBSTR(VARY_REC,1,
                                                     OTHER_PADDING(I))
                          ||SUBSTR(VARY_REC,OTHER_PADDING(I)+9),
                        END;
                     DO I = 0 TO 472 BY 8;
                        VARY_REC=SUBSTR(VARY_REC,1,I)||
                                                 SUBSTR(VARY_REC,I+9);
                        END;
                     END;
             VARY_REC=SUBSTR(VARY_REC,1,LENGTH(VARY_REC)-
                                                        CHOP_OFF(J));
             WRITE FILE(ISAM4BP) FROM(VARY_REC) KEYFROM(VARY_KEY);
             LAST_KEY = VARY_KEY;
             HIT = 1B;
             END;
       ELSE DO; DUMMY_KEY = SUBSTR(VARY_KEY,1,5)||RECORD_TYPE(J);
            /*             FOR COMPLETENESS
             WRITE FILE(ISAM4BP) FROM(DUMMY_REC) KEYFROM(DUMMY_KEY);
             */
             LAST_KEY = DUMMY_KEY;
             HIT = 0B;
             END;
       END;
    END;
 END CREATE_4BP;
//GO.COUNT4BP DD DSNAME=IED13.COUNT4BP,DISP=OLD
//GO.ISAM4BP DD DSNAME=IED13.ISAM4BP,DISP=(,CATLG),
//        LABEL=EXPDT=75300,SPACE=(CYL,(95,1),RLSE),
//        VOL=SER=USER03,UNIT=DISK,
//        DCB=(RECFM=VB,DSORG=IS,LRECL=9435,BLKSIZE=9439,BUFNO=3,
//        KEYLEN=7,RKP=4)
```

ISAM4BH SOURCE LISTING

```
(STRINGRANGE):
CREATE_4BH: PROC OPTIONS(MAIN);
DECLARE ISAM4BH FILE RECORD SEQUENTIAL KEYED ENVIRONMENT(INDEXED),
        HIT BIT(1) INIT(1B),
        RECORD_TYPE(6) CHAR(2) INIT('01','02','07','08','09','10'),
        SUBSEQUENT_READS(6) FIXED BIN(15) INIT(6,5,6,4,4,6),
        CHOP_OFF(6) FIXED BIN(15) INIT(912,296,952,520,1416,232),
        TYPE1_PAD(2) FIXED BIN(15) INIT(112,232),
        (I, J, K) FIXED BIN(17),
        (LAST_KEY,VARY_KEY,DUMMY_KEY) CHAR(7),
        DUMMY_REC BIT(8) INIT((8)'1'B),
        REC CHAR(1680),
        VARY_REC CHAR(11760) VARYING,
        COUNTY PIC'99',
        THEIR_COUNTY PIC'999' DEFINED REC POS(109),
        CCD CHAR(3) DEFINED REC POS(112),
        TYPE CHAR(2) DEFINED REC POS(118);

   ON ENDFILE(COUNT4BH) BEGIN;
                        PUT FILE(SYSPRINT) LIST('*ISAM4BH CREATED');
                        STOP;
                        END;

   ON ERROR SNAP BEGIN; ON ERROR SYSTEM;
                 PUT FILE(SYSPRINT) LIST(SUBSTR(REC,1,120));
                 PUT FILE(SYSPRINT) DATA(VARY_KEY,LAST_KEY);
                 CLOSE FILE(ISAM4BH), FILE(COUNT4BH);
                 END;

 DO WHILE(1B);

 DO J = 1 TO 6;
    IF HIT THEN DO; READ FILE(COUNT4BH) INTO(REC);
                    COUNTY = THEIR_COUNTY / 2 + 1;
                    VARY_KEY = COUNTY||CCD||TYPE;
                    VARY_REC = SUBSTR(REC,121);
                    END;
    IF RECORD_TYPE(J) = TYPE
       THEN DO; DO K = 1 TO SUBSEQUENT_READS(J);
                   READ FILE(COUNT4BH) INTO(REC);
                   VARY_REC = VARY_REC || REC;
                   END;
                VARY_REC = SUBSTR(VARY_REC,1,LENGTH(VARY_REC)-
                                                           CHOP_OFF(J));
                IF RECORD_TYPE(J) = '01'
                   THEN DO; DO K = 1 TO HBOUND(TYPE1_PAD,1);
                               VARY_REC=SUBSTR(VARY_REC,1,TYPE1_PAD(K))
                                  || SUBSTR(VARY_REC,TYPE1_PAD(K)+9);
                               END;
```

ISAM4BH SOURCE LISTING

```
                        DO K = 0 TO 160 BY 8;
                           VARY_REC=SUBSTR(VARY_REC,1,K) ||
                                            SUBSTR(VARY_REC,K+9);
                           END;
                        END;
              WRITE FILE(ISAM4BH) FROM(VARY_REC) KEYFROM(VARY_KEY);
              LAST_KEY = VARY_KEY;
              HIT = 1B;
              END;
      ELSE DO; DUMMY_KEY = SUBSTR(VARY_KEY,1,5)||RECORD_TYPE(J);
             /*                FOR COMPLETENESS
              WRITE FILE(ISAM4BH) FROM(DUMMY_REC) KEYFROM(DUMMY_KEY);
              */
              LAST_KEY = DUMMY_KEY;
              HIT = 0B;
              END;
      END;
   END;
 END CREATE_4BH;
//GO.COUNT4BH DD DSNAME=IED13.COUNT4BH,DISP=OLD
//GO.ISAM4BH DD DSNAME=IED13.ISAM4BH,DISP=(,CATLG),
//         UNIT=SYSDA,
//         LABEL=EXPDT=76365,SPACE=(CYL,(200)),
//         DCB=(RECFM=VB,DSORG=IS,LRECL=11420,BLKSIZE=11424,
//         KEYLEN=7,RKP=4)
//
```

CENSHEAD

POPULATION HEADINGS SOURCE PROGRAM

```
//STEP1 EXEC ZAP
//SYSIN DD *
 IED13.D4HEAD
//ONE EXEC PL1LFCG,PARM='ATR,XREF'
//SYSIN DD *
 TITLES: PROC OPTIONS(MAIN);
 /* THIS PROGRAM MOVES THE DAULIST 4 POP HEADERS FROM TAPE TO DISK.   */
 /* (SO THAT THE DAULIST 4 POP PROGRAM CAN MOVE IT AGAIN - HOW STUPID)*/
 DECLARE (DLIST4,DHEADERS) RECORD,
         CARD CHAR(80);
    DO I = 1 TO 1502;
         READ FILE(DLIST4) INTO (CARD);
         WRITE FILE(DHEADERS) FROM (CARD);
    END;
 /* THIS PORTION OF THE PROGRAM IS TO PATCH UP THE CB'S DATASET.      */
    DO I = 1 TO 9;
         READ FILE(SYSIN) INTO (CARD);
         WRITE FILE (DHEADERS) FROM (CARD);
    END;
    PUT SKIP(2) FILE(SYSPRINT) EDIT ('**** DAULIST-4 HEADER FILE SUCCESS
 FULLY CREATED')    (COL(10),A);
 END TITLES;
//GO.SYSIN DD *

7  'WORKER' INCLUDES MEMBERS OF THE ARMED AND ALARMED FORCES.

8  ANY GIVEN UNIT MAY BE TALLIED IN MORE THAN ONE INCOME CATEGORY, ACTUA

9  LACKING ONE OR MORE OF THE FOLLOWING FACILITIES- HOT PIPED WATER, FLU
   TOILET FOR THIS HOUSEHOLD ONLY, OR BATHTUB OR SHOWER FOR THIS HOUSEHO
   ONLY, OR NEITHER, OR BOTH.

//GO.DLIST4 DD DSNAME=IED13.DLIST4P,DISP=OLD,LABEL=(4,SL),
//        VOL=REF=IED13.DLIST1
//GO.DHEADERS DD DSNAME=IED13.D4HEAD,DISP=(,CATLG),
//        UNIT=DISK,LABEL=EXPDT=75300,SPACE=(TRK,(8,4),RLSE),
//        DCB=(RECFM=FB,LRECL=80,BLKSIZE=6400)
// EXEC PL1FCLG
//SYSIN DD *

      (SUBSCRIPTRANGE,STRINGRANGE):
 NASA:
      PROCEDURE OPTIONS(MAIN);
      ON ERROR PUT DATA;
      ON ENDFILE(INPUT) BEGIN;
                              TYPE='3';
                              GO TO TYPE_1;
                              END;
 /* LINE_COUNT INDICATES THE CURRENT LINE,   */
 /* BEGIN(LINE_COUNT+1) IS THE STRING OFFSET  */
```

POPULATION HEADINGS SOURCE PROGRAM

```
/* OF THE NEXT LINE.                                   */
    DECLARE HEADINGS FILE RECORD SEQUENTIAL KEYED ENVIRONMENT(INDEXED),
        INPUT FILE SEQUENTIAL,
        TABLE_KEY CHARACTER(3) DEFINED SENTENCE POSITION(1),
        MESSAGE CHARACTER(76) DEFINED SENTENCE POSITION(4),
        TYPE CHARACTER(1) DEFINED SENTENCE POSITION(80),
        KEY PICTURE'999',
        LAST_TYPE CHARACTER(1),  /* LAST_TYPE='4' INFERS NO
                                    RECORD HAS BEEN PREVIOUSLY READ */
        BEGIN(60) PICTURE '9999' INITIAL(1),
        (L,LINE_COUNT INITIAL(0),M) FIXED BINARY,
        BLNK CHARACTER(5) INITIAL('     '),
        BLANK CHARACTER (132) INITIAL ((132)' '),
        TEXT CHARACTER(3000) VARYING,
        SENTENCE CHARACTER(80);
     TYPE='4';  /* REFRIGERATOR */
LOOP:
     LAST_TYPE=TYPE;
     READ FILE(INPUT) INTO(SENTENCE);
     L=INDEX(MESSAGE,BLNK)-1;
     IF (TYPE¬='2'&LAST_TYPE='2')|(TYPE='9'&LAST_TYPE='1') THEN DO;
        M=133-MOD(BEGIN(LINE_COUNT+1),132);
          IF M¬=133 THEN DO;
               TEXT=TEXT||SUBSTR(BLANK,1,M);
               BEGIN(LINE_COUNT+1)=BEGIN(LINE_COUNT+1)+M;
               END;
        END;
     IF TYPE='2' THEN GO TO TYPE_2;
     IF TYPE='9' THEN GO TO TYPE_9;
     IF TYPE='8' THEN GO TO TYPE_8;
     IF TYPE=' ' THEN GO TO TYPE_0;
     GO TO TYPE_1;
TYPE_8: TYPE_0:
     IF SUBSTR(SENTENCE,1,1)¬=' ' THEN DO;
                                         TEXT=TEXT||SUBSTR(BLANK,1,1);
                                         BEGIN(LINE_COUNT+1)=
                                          BEGIN(LINE_COUNT+1)+1;
                                         END;
     TEXT=TEXT||SUBSTR(SENTENCE,1,L+3);
     IF LAST_TYPE='8' THEN BEGIN(LINE_COUNT+1)=BEGIN(LINE_COUNT+1)
                           +L+3;
                      ELSE DO;
                              LINE_COUNT=LINE_COUNT+1;
                              BEGIN(LINE_COUNT+1)=BEGIN(LINE_COUNT)+L
                               +3;
                              END;
     GO TO LOOP;
TYPE_1:
     IF LAST_TYPE ¬= '4' THEN DO;
                                DO KJ=1 TO LINE_COUNT+1;
```

POPULATION HEADINGS SOURCE PROGRAM

```
                                            BEGIN(KJ)=BEGIN(KJ)+4*(LINE_COUNT+1);
                                            END;
                                           TEXT=SUBSTR(STRING(BEGIN),1,4*
                                               (LINE_COUNT+1))||TEXT;
                                           WRITE FILE(HEADINGS) FROM(TEXT)
                                                                KEYFROM(KEY);
                                           IF TYPE='3' THEN GO TO END_PROG;
                                           LINE_COUNT=0;
                                           BEGIN(1)=1;
                                           END;
      LINE_COUNT=LINE_COUNT+1;
      IF TABLE_KEY='    ' THEN GO TO FOOTNOTES;
      KEY=TABLE_KEY;
      TEXT=SUBSTR(MESSAGE,1,L);
      BEGIN(LINE_COUNT+1)=BEGIN(LINE_COUNT)+L;
      GO TO LOOP;
 TYPE_2:
      TEXT=TEXT||SUBSTR(MESSAGE,1,L);
      BEGIN(LINE_COUNT+1)=BEGIN(LINE_COUNT+1)+L;
      GO TO LOOP;
 TYPE_9:
      TEXT=TEXT||SUBSTR(SENTENCE,1,79)||SUBSTR(BLANK,1,53);
      BEGIN(LINE_COUNT+1)=BEGIN(LINE_COUNT+1)+132;
      GO TO LOOP;
 FOOTNOTES:
      LINE_COUNT=0;
      DO KJ=1431 TO 1475;
         READ FILE(INPUT) INTO(SENTENCE);
         END;
     KEY='128';
      TEXT=SENTENCE;
      BEGIN(LINE_COUNT+1)=81;
      DO WHILE(1B);      /* ENDFILE(INPUT) TERMINATES THIS LOOP */
                  READ FILE(INPUT) INTO(SENTENCE);
                  TEXT=TEXT||SENTENCE;
                  BEGIN(LINE_COUNT+1)=BEGIN(LINE_COUNT+1)+80;
                  END;
 END_PROG:
      END NASA;
//GO.INPUT DD
//GO.HEADINGS DD
//
```

HOUSHEAD

HOUSING HEADINGS SOURCE PROGRAM

```
//  EXEC ZAP
//SYSIN DD *
  IED13.MHEAD
//STEP1 EXEC PL1LFCLG,PARM='ATR,NEXT,XREF'
//SYSIN DD *
 MODIFY_REC:
     PROCEDURE OPTIONS(MAIN);
          DECLARE COUNTER FIXED BINARY(31);
          DECLARE OLDREC FILE INPUT RECORD;
          DECLARE NEWREC FILE OUTPUT RECORD;
          DECLARE MOD4 CHARACTER(80);
          DECLARE MOD3 CHARACTER(80);
          DECLARE MOD1 CHARACTER(68);
          DECLARE MOD2 CHARACTER(68);
          DECLARE TOGETHER CHARACTER(136);
          OPEN FILE(OLDREC) INPUT;
          OPEN FILE (NEWREC) OUTPUT;
          COUNTER=0;
 AGAIN:
          IF COUNTER>4092 THEN GO TO STOPIT;
                 COUNTER=COUNTER+1;
                 READ FILE (OLDREC) INTO (MOD3);
                 READ FILE (OLDREC) INTO (MOD4);
                 MOD1=SUBSTR(MOD3,1,68);
                 MOD2=SUBSTR(MOD4,1,68);
                 TOGETHER=MOD1||MOD2;
                 WRITE FILE (NEWREC) FROM ( TOGETHER);
          GO TO AGAIN;
 STOPIT:
          CLOSE FILE (OLDREC);
          CLOSE FILE (NEWREC);
     END MODIFY_REC;
//GO.OLDREC DD DSNAME=IED13.SLIST4H,DISP=OLD,VOL=REF=IED13.SLIST4H
//GO.NEWREC DD DSNAME=&&TEMP,DISP=(NEW,PASS),
//  DCB=(LRECL=136,BLKSIZE=1360,RECFM=FB),UNIT=SYSDA,
//  SPACE=(TRK,(10,10),RLSE)
//STEP1 EXEC PL1LFCLG,PARM='ATR,NEST,XREF',REGION=128K
//SYSIN DD *
 HEADINGS:
   PROCEDURE OPTIONS(MAIN);
     ON ERROR PUT DATA;
     DECLARE BL1 CHARACTER(1) INITIAL(' '),
          ONE CHARACTER(1) INITIAL('1'),
          NINE CHARACTER(1) INITIAL('9'),
          (CONT,Z,ZERO,COL_OR_ROW) CHARACTER(1) INITIAL('0'),
          HEAD1 CHARACTER(132) VARYING,
          HEAD2 CHARACTER(132) VARYING,
          COLON CHARACTER(1) INITIAL(':'),
          CL FIXED BINARY(31),
          TAB CHARACTER(3) INITIAL('  1'),
```

HOUSING HEADINGS SOURCE PROGRAM

```
        TABNO CHARACTER(3),
        FOOT_LEN PICTURE '9999' INITIAL(0),
        FOOTNOTE CHARACTER(2700) VARYING,
        RECORD CHARACTER(136),
        BLANKS CHARACTER(132) VARYING,
        (NUM_PARTS,L) FIXED BINARY(31) INITIAL(1),
        (FLAG1,FLAG2,LENG,NEXT_OFFSET,RLEN,SUPPRESS)
             FIXED BINARY(31) INITIAL(0),
        M_C_LENGTH(10) FIXED BINARY(31),
        BL20 CHARACTER(20) INITIAL('                    '),
        BL4 CHARACTER(4) INITIAL('    '),
        (ADDIT,OFFSET) CHARACTER(4),
        ROWL PICTURE '9999' INITIAL(1),
        (NEWL,NUM,NEW_OFFSET) PICTURE '9999',
        (SAVEIT,ROWLEN,ROWHEAD,RECLEN,LEN) CHARACTER(500) VARYING,
        RECHEAD CHARACTER(2996) VARYING,
        (REDONE,MAINHEAD,COLHEAD,M_C_HEADING,SAVEAREA)
             CHARACTER(2000) VARYING,
        BL2 CHARACTER(2) INITIAL('  '),
        BL30 CHARACTER(30) INITIAL('                              '),
        BL10 CHARACTER(10) INITIAL('          '),
        KEYIT PICTURE '999' INITIAL(1),
        RECORD1 INPUT RECORD;
    DECLARE RECOHD RECORD SEQUENTIAL KEYED ENVIRONMENT(INDEXED)
        OUTPUT;

    OPEN FILE (RECORD1) INPUT;
    OPEN FILE (RECOHD) OUTPUT;

    FOOTNOTE='';
    HEAD1='';
    HEAD2='';
    ROWHEAD='';
    SAVEAREA='';
    DO I=1 TO 10;
        M_C_LENGTH(I)=0;
        END;
    LEN='';
    RECHEAD='';
    ROWLEN='0001';

AGAIN:
    BLANKS='';

    READ FILE (RECORD1) INTO (RECORD);
    TABNO=SUBSTR(RECORD,1,3);
    IF TABNO¬=TAB THEN DO;
    IF TABNO=999 THEN DO;
        ROWL='0009';
        NUM=ROWL+FOOT_LEN;
```

HOUSING HEADINGS SOURCE PROGRAM

```
        RECHEAD=ROWL||NUM||FOOTNOTE;
        WRITE FILE(RECOHD) FROM (RECHEAD) KEYFROM (KEYIT);
PUT DATA;
        GO TO STOPIT;
        END;
        NUM=ROWL;
        DO I=1 TO NUM_PARTS-1;
             NUM=NUM+M_C_LENGTH(I);
             LEN=LEN||NUM;
             END;
        DO I=1 TO NUM_PARTS-1;
             RECLEN=ROWLEN||LEN;
             END;
        RECLEN=RECLEN||BL2;
        RLEN=INDEX(RECLEN,BL2);
        NUM_OFFSETS=(RLEN-1)/4;
        NEXT_OFFSET=1;
        DO I=1 TO NUM_OFFSETS;
             OFFSET=SUBSTR(RECLEN,NEXT_OFFSET,4);
             NEW_OFFSET=OFFSET+RLEN-1;
             REDONE=REDONE||NEW_OFFSET;
             NEXT_OFFSET=NEXT_OFFSET+4;
             END;
        RECHEAD=REDONE||ROWHEAD||M_C_HEADING;
        WRITE FILE (RECOHD) FROM (RECHEAD) KEYFROM (KEYIT);


        KEYIT=KEYIT+1;
        BLANKS='';
        HEAD1='';
        HEAD2='';
        CONT='0';
        RECHEAD='';
        LEN='';
        FLAG1=0;
        ROWHEAD='';
        Z='0';
        ROWLEN='0001';
        REDONE='';
        MAINHEAD='';
        ROWL=1;
        NUM_PARTS=1;
        COLHEAD='';
        SUPPRESS=0;
        COLLEN=0;
        POINTER=0;
        L=1;
        MAINLEN=0;
        SAVEAREA='';
        M_C_HEADING='';
```

HOUSING HEADINGS SOURCE PROGRAM

```
        DO I=1 TO 10;
              M_C_LENGTH(I)=0;
              END;

        END;
    TAB=TABNO;

    IF TABNO=998 THEN DO;
          MAINHEAD=SUBSTR(RECORD,5,132);
          FOOTNOTE=FOOTNOTE||MAINHEAD;
          FOOT_LEN=FOOT_LEN+132;
PUT DATA;
          GO TO AGAIN;
          END;

    COL_OR_ROW=SUBSTR(RECORD,4,1);
    CONT=SUBSTR(RECORD,5,1);

    IF COL_OR_ROW ¬= SUPPRESS THEN DO;
          SUPPRESS=COL_OR_ROW;
          IF COL_OR_ROW=0 THEN GO TO STOP;
          IF Z='2' THEN FLAG1=1;
          NUM_PARTS=NUM_PARTS+1;
STOP:
          END;

    IF COL_OR_ROW¬=ZERO THEN GO TO RHEAD;
    SAVEAREA=SUBSTR(RECORD,7,130);
    CL=INDEX(SAVEAREA,COLON);
    IF CL¬=0 THEN DO;
          HEAD1=SUBSTR(SAVEAREA,1,CL);
          HEAD2=SUBSTR(SAVEAREA,33,98);
          NUM_BLANKS=132-CL;
          DO I=1 TO NUM_BLANKS;
                BLANKS=BLANKS||' ';
                END;
          HEAD1=HEAD1||BLANKS;
          BLANKS='';
          NUM_BLANKS=34;
          DO I=1 TO NUM_BLANKS;
                BLANKS=BLANKS||' ';
                END;
          HEAD2=HEAD2||BLANKS;
          MAINHEAD=HEAD1||HEAD2;
          M_C_HEADING=M_C_HEADING||MAINHEAD;
          M_C_LENGTH(NUM_PARTS)=M_C_LENGTH(NUM_PARTS)+264;
          GO TO AGAIN;
          END;
    L=INDEX(SAVEAREA,BL30);
    IF L=1 THEN GO TO COLUMN;
```

HOUSING HEADINGS SOURCE PROGRAM

```
     IF L=0 THEN L=132;

     MAINHEAD=SUBSTR(SAVEAREA,1,L);
     NUM_BLANKS=132-L;
     DO I= 1 TO NUM_BLANKS;
           BLANKS=BLANKS||' ';
           END;

     M_C_HEADING=M_C_HEADING||MAINHEAD||BLANKS;
     M_C_LENGTH(NUM_PARTS)=M_C_LENGTH(NUM_PARTS)+132;
     GO TO AGAIN;

COLUMN:
     SAVEAREA=SUBSTR(RECORD,38,99);
     L=INDEX(SAVEAREA,BL30);
     IF L=0 THEN L=99;
     COLHEAD=SUBSTR(SAVEAREA,1,L);
     NUM_BLANKS=133-L;
     DO I=1 TO NUM_BLANKS;
           BLANKS=BLANKS||' ';
           END;

     M_C_HEADING=M_C_HEADING||COLHEAD||BLANKS;
     M_C_LENGTH(NUM_PARTS)=M_C_LENGTH(NUM_PARTS)+132;
     GO TO AGAIN;

RHEAD:
     IF FLAG1=1 THEN GO TO AGAIN;

     Z='2';
     SAVEIT=SUBSTR(RECORD,7,129);
     L=INDEX(SAVEIT,BL4);
     SAVEAREA=SUBSTR(SAVEIT,1,L-1);
     IF L=1 THEN SAVEAREA=' ';
     IF L=1 THEN ROWL=ROWL+1;
          ELSE
       ROWL=ROWL+(L-1);

     IF FLAG2=2 THEN DO;
          ROWLEN=ROWLEN||BL2;
          LENG=INDEX(ROWLEN,BL2);
          ADDIT=SUBSTR(ROWLEN,LENG-4,4);
          NEWL=ADDIT+(L-1);
          ROWLEN=SUBSTR(ROWLEN,1,LENG-5);
          ROWLEN=ROWLEN||NEWL;
          ROWHEAD=ROWHEAD||SAVEAREA;
          IF CONT='1' THEN FLAG2=2;
               ELSE
          FLAG2=0;
          GO TO AGAIN;
```

HOUSING HEADINGS SOURCE PROGRAM

```
        END;

    ROWLEN=ROWLEN||ROWL;
    ROWHEAD=ROWHEAD||SAVEAREA;

    IF CONT='1' THEN FLAG2=2;
    GO TO AGAIN;
 STOP IT:
    END HEADINGS;
//GO.RECORD1 DD DSNAME=&&TEMP,DISP=(OLD,DELETE)
//GO.RECOHD DD DSNAME=IED13.MHEAD,DISP=(NEW,CATLG),
//  SPACE=(CYL,(1,1),RLSE),UNIT=DISK,DCB=(RECFM=VB,KEYLEN=3,
//  DSORG=IS,RKP=4,
//  BLKSIZE=2996),LABEL=EXPDT=76300
//
```

FIX_THIS

```
//STEP1 EXEC PL1LFCLG,PARM='ATR,NEXT,XREF'
//SYSIN DD *
 FIX:
     PROCEDURE OPTIONS(MAIN);
     DECLARE RECORDS FILE INPUT RECORD;
     DECLARE COUNTER FIXED BINARY(31);
     DECLARE NEWREC FILE OUTPUT RECORD;
     DECLARE (REC,FIXED_RECORD) CHARACTER(80);
     COUNTER=0;
 NEXT_REC:
     READ FILE (RECORDS) INTO (REC);
     COUNTER=COUNTER+1;
     IF COUNTER=4091 THEN DO;
          GET DATA(FIXED_RECORD);
          REC=FIXED_RECORD;
     WRITE FILE (NEWREC) FROM (REC);
           GET DATA(FIXED_RECORD);
          REC=FIXED_RECORD;
     WRITE FILE (NEWREC) FROM (REC);
          GO TO STOP;
          END;
     WRITE FILE (NEWREC) FROM (REC);
          GO TO NEXT_REC;
 STOP:
     END FIX;
//GO.SYSIN DD *
FIXED_RECORD='9990
                ';
FIXED_RECORD='
                ';
//GO.RECORDS DD DSNAME=IED13.MLIST4H,DISP=OLD,VOL=REF=IED13.MLIST4H
//GO.NEWREC DD DSNAME=IED13.SLIST4H,DISP=(NEW,CATLG),LABEL=(1,SL),
//  UNIT=TAPE,DCB=(RECFM=F,BLKSIZE=80)
//  EXEC ZAP
//SYSIN DD *
  IED13.MHEAD
//STEP1 EXEC PL1LFCLG,PARM='ATR,NEXT,XREF'
//SYSIN DD *
 MODIFY_REC:
      PROCEDURE OPTIONS(MAIN);
          DECLARE COUNTER FIXED BINARY(31);
          DECLARE OLDREC FILE INPUT RECORD;
          DECLARE NEWREC FILE OUTPUT RECORD;
          DECLARE MOD4 CHARACTER(80);
          DECLARE MOD3 CHARACTER(80);
          DECLARE MOD1 CHARACTER(68);
          DECLARE MOD2 CHARACTER(68);
          DECLARE TOGETHER CHARACTER(136);
          OPEN FILE(OLDREC) INPUT;
          OPEN FILE (NEWREC) OUTPUT;
```

```
         COUNTER=0;
 AGAIN:
         IF COUNTER>4092 THEN GO TO STOPIT;
              COUNTER=COUNTER+1;
              READ FILE (OLDREC) INTO (MOD3);
              READ FILE (OLDREC) INTO (MOD4);
              MOD1=SUBSTR(MOD3,1,68);
              MOD2=SUBSTR(MOD4,1,68);
              TOGETHER=MOD1||MOD2;
              WRITE FILE (NEWREC) FROM ( TOGETHER);
         GO TO AGAIN;
 STOPIT:
         CLOSE FILE (OLDREC);
         CLOSE FILE (NEWREC);
      END MODIFY_REC;
//GO.OLDREC DD DSNAME=IED13.SLIST4H,DISP=OLD,VOL=REF=IED13.SLIST4H
//GO.NEWREC DD DSNAME=&&TEMP,DISP=(NEW,PASS),
//  DCB=(LRECL=136,BLKSIZE=1360,RECFM=FB),UNIT=SYSDA,
//  SPACE=(TRK,(10,10),RLSE)
//STEP1 EXEC PL1LFCLG,PARM='ATR,NEST,XREF',REGION=128K
//SYSIN DD *
 HEADINGS:
   PROCEDURE OPTIONS(MAIN);
     ON ERROR PUT DATA;
     DECLARE BL1 CHARACTER(1) INITIAL(' '),
          ONE CHARACTER(1) INITIAL('1'),
          NINE CHARACTER(1) INITIAL('9'),
          (CONT,Z,ZERO,COL_OR_ROW) CHARACTER(1) INITIAL('0'),
          HEAD1 CHARACTER(132) VARYING,
          HEAD2 CHARACTER(132) VARYING,
          COLON CHARACTER(1) INITIAL(':'),
          CL FIXED BINARY(31),
          TAB CHARACTER(3) INITIAL('  1'),
          TABNO CHARACTER(3),
          FOOT_LEN PICTURE '9999' INITIAL(0),
          FOOTNOTE CHARACTER(2700) VARYING,
          RECORD CHARACTER(136),
          BLANKS CHARACTER(132) VARYING,
          (NUM_PARTS,L) FIXED BINARY(31) INITIAL(1),
          (FLAG1,FLAG2,LENG,NEXT_OFFSET,RLEN,SUPPRESS)
               FIXED BINARY(31) INITIAL(0),
          M_C_LENGTH(10) FIXED BINARY(31),
          BL20 CHARACTER(20) INITIAL('                    '),
          BL4 CHARACTER(4) INITIAL('    '),
          (ADDIT,OFFSET) CHARACTER(4),
          ROWL PICTURE '9999' INITIAL(1),
          (NEWL,NUM,NEW_OFFSET) PICTURE '9999',
          (SAVEIT,ROWLEN,ROWHEAD,RECLEN,LEN) CHARACTER(500) VARYING,
          RECHEAD CHARACTER(2996) VARYING,
          (REDONE,MAINHEAD,COLHEAD,M_C_HEADING,SAVEAREA)
```

```
            CHARACTER(2CCJ) VARYING,
        BL2 CHARACTER(2) INITIAL('  '),
        BL3C CHARACTER(30) INITIAL('                              '),
        BL1C CHARACTER(10) INITIAL('          '),
        KEYIT PICTURE '999' INITIAL(1),
        RECCRC1 INPUT RECORD;
    DECLARE RECCHD RECORD SEQUENTIAL KEYEC ENVIRONMENT(INCEXEC)
        CLTPLT;

    OPEN FILE (RECCRC1) INPUT;
    OPEN FILE (RECCHD) CLTPLT;

    FCCTNCTE='';
    HEAD1='';
    HEAD2='';
    RCWHEAC='';
    SAVEAREA='';
    DC I=1 TC 1C;
        M_C_LENGTH(I)=C;
        ENC;
    LEN='';
    RECHEAD='';
    RCWLEN='CCC1';

AGAIN:
    BLANKS='';

    READ FILE (RECORD1) INTO (RECCRD);
    TABNO=SLBSTR(RECCRC,1,3);
    IF TABNC¬=TAB THEN DC;
    IF TABNO=999 THEN DO;
        RCWL='CC09';
        NLM=RCWL+FCOT_LEN;
        RECHEAD=ROWL||NLM||FCCTNCTE;
        WRITE FILE(RECOHC) FROM (RECHEAD) KEYFROM (KEYIT);
PLT DATA;
        GC TC STOPIT;
        ENC;
        NUM=RCWL;
        CC I=1 TC NUM_PARTS-1;
            NLM=NLM+M_C_LENGTH(I);
            LEN=LEN||NUM;
            ENC;
        DO I=1 TC NUM_PARTS-1;
            RECLEN=ROWLEN||LEN;
            ENC;
        RECLEN=RECLEN||BL2;
        RLEN=INCEX(RECLEN,BL2);
        NUM_CFFSETS=(RLEN-1)/4;
        NEXT_OFFSET=1;
```

ORIGINAL PAGE IS
OF POOR QUALITY

```
        DO I=1 TO NUM_OFFSETS;
             OFFSET=SUBSTR(RECLEN,NEXT_OFFSET,4);
             NEW_OFFSET=OFFSET+RLEN-1;
             RECONE=RECONE||NEW_OFFSET;
             NEXT_OFFSET=NEXT_OFFSET+4;
             END;
        RECHEAD=RECONE||ROWHEAD||M_C_HEADING;
        WRITE FILE (RECOHD) FROM (RECHEAD) KEYFROM (KEYIT);


        KEYIT=KEYIT+1;
        BLANKS='';
        HEAD1='';
        HEAD2='';
        CONT='C';
        RECHEAD='';
        LEN='';
        FLAG1=0;
        ROWHEAD='';
        Z='C';
        ROWLEN='0001';
        RECONE='';
        MAINHEAD='';
        ROWL=1;
        NUM_PARTS=1;
        COLHEAD='';
        SUPPRESS=0;
        COLLEN=0;
        POINTER=0;
        L=1;
        MAINLEN=0;
        SAVEAREA='';
        M_C_HEADING='';
        DO I=1 TO 10;
             M_C_LENGTH(I)=0;
             END;

        END;
   TAB=TABNO;

   IF TABNO=998 THEN DO;
        MAINHEAD=SUBSTR(RECORD,5,132);
        FOOTNOTE=FOOTNOTE||MAINHEAD;
        FOOT_LEN=FOOT_LEN+132;
PUT DATA;
        GO TO AGAIN;
        END;

   COL_OR_ROW=SUBSTR(RECORD,4,1);
   CONT=SUBSTR(RECORD,5,1);
```

```
     IF COL_OR_ROW ¬= SUPPRESS THEN DO;
          SUPPRESS=COL_OR_ROW;
          IF COL_OR_ROW=0 THEN GO TO STOP;
          IF Z='2' THEN FLAG1=1;
          NUM_PARTS=NUM_PARTS+1;
STOP:
          END;

     IF COL_OR_ROW¬=ZERO THEN GO TO RHEAD;
     SAVEAREA=SUBSTR(RECORD,7,130);
     CL=INDEX(SAVEAREA,COLON);
     IF CL¬=0 THEN DO;
          HEAD1=SUBSTR(SAVEAREA,1,CL);
          HEAD2=SUBSTR(SAVEAREA,33,98);
          NUM_BLANKS=132-CL;
          DO I=1 TO NUM_BLANKS;
               BLANKS=BLANKS||' ';
               END;
          HEAD1=HEAD1||BLANKS;
          BLANKS='';
          NUM_BLANKS=34;
          DO I=1 TO NUM_BLANKS;
               BLANKS=BLANKS||' ';
               END;
          HEAD2=HEAD2||BLANKS;
          MAINHEAD=HEAD1||HEAD2;
          M_C_HEADING=M_C_HEADING||MAINHEAD;
          M_C_LENGTH(NUM_PARTS)=M_C_LENGTH(NUM_PARTS)+264;
          GO TO AGAIN;
          END;
     L=INDEX(SAVEAREA,BL30);
     IF L=1 THEN GO TO COLUMN;
     IF L=0 THEN L=132;

     MAINHEAD=SUBSTR(SAVEAREA,1,L);
     NUM_BLANKS=132-L;
     DO I= 1 TO NUM_BLANKS;
          BLANKS=BLANKS||' ';
          END;

     M_C_HEADING=M_C_HEADING||MAINHEAD||BLANKS;
     M_C_LENGTH(NUM_PARTS)=M_C_LENGTH(NUM_PARTS)+132;
     GO TO AGAIN;

COLUMN:
     SAVEAREA=SUBSTR(RECORD,38,99);
     L=INDEX(SAVEAREA,BL30);
     IF L=0 THEN L=99;
     COLHEAD=SUBSTR(SAVEAREA,1,L);
```

```
    NUM_BLANKS=133-L;
    DO I=1 TO NUM_BLANKS;
         BLANKS=BLANKS||' ';
         END;

    M_C_HEADING=M_C_HEADING||COLHEAD||BLANKS;
    M_C_LENGTH(NUM_PARTS)=M_C_LENGTH(NUM_PARTS)+132;
    GO TO AGAIN;

RHEAD:
    IF FLAG1=1 THEN GO TO AGAIN;

    Z='2';
    SAVEIT=SUBSTR(RECORD,7,129);
    L=INDEX(SAVEIT,BL4);
    SAVEAREA=SUBSTR(SAVEIT,1,L-1);
    IF L=1 THEN SAVEAREA=' ';
    IF L=1 THEN ROWL=ROWL+1;
       ELSE
     ROWL=ROWL+(L-1);

    IF FLAG2=2 THEN DO;
         ROWLEN=ROWLEN||BL2;
         LENG=INDEX(ROWLEN,BL2);
         ACCIT=SUBSTR(ROWLEN,LENG-4,4);
         NEWL=ACCIT+(L-1);
         ROWLEN=SUBSTR(ROWLEN,1,LENG-5);
         ROWLEN=ROWLEN||NEWL;
         ROWHEAD=ROWHEAD||SAVEAREA;
         IF CONT='1' THEN FLAG2=2;
              ELSE
         FLAG2=0;
         GO TO AGAIN;
         END;

     ROWLEN=ROWLEN||ROWL;
     ROWHEAD=ROWHEAD||SAVEAREA;

     IF CONT='1' THEN FLAG2=2;
     GO TO AGAIN;
  STOPIT:
     END HEADINGS;
//GO.RECORD1 DD DSNAME=&&TEMP,DISP=(OLD,DELETE)
//GO.RECORD DD DSNAME=IED13.MHEAD,DISP=(NEW,CATLG),
//  SPACE=(CYL,(1,1),RLSE),UNIT=DISK,DCB=(RECFM=VB,KEYLEN=3,
//  DSORG=IS,RKP=4,
//  BLKSIZE=2996),LABEL=EXPDT=76300
```

APPENDIX B

DOCUMENTATION AND SOURCE CODE LISTINGS
FOR THE ARISCENS PROCESSING SOFTWARE

VARIABLES COMMON TO HOUSLIST AND CENSLIST

AGGREGATE: global; an array aggragate built from ISAM4BP/ ISAM4BH records

AGGREGATE: READ_PARM_SET; a character string whose value is set in the input stream via a GET FILE (INPUT) DATA

AGGREGATING: global; a bit variable whose value is set in READ_PARM_SET; used to direct program flow

ANY_TABLE: OUTPUT_TABLE; parameter used when writing tables

BAD_DATA: READ_PARM_SET; condition signaled when any of the values of the variables set in READ_PARM_SET is erroneous

BASE: global; floating point number given value from the parameter set; one of the two components of CHARACTERISTIC

BASE_TYPE: Search_4BH; variable set equal to the value of the RECORD_TYPE returned by FIND_TYPE

BOUNDS: global; an array aggregate initialized such that each row vector holds the dimensions and offset from the beginning of POP_REC/REC_CHAR of the table that the row number represents

BOUNDS_ONLY: global; a based structure (BOUNDS_PTR) containing ROWS, COLUMNS, and TABLE_OFFSET that is overliad on the rows of BOUNDS to reduce subscripting

BOUNDS_PTR: global; a pointer (see BOUNDS_OVLY)

C_WIDE: OUTPUT_TABLE; the number of columns per line (must be ≤ 9)

CAT_TYPE: SEARCH_4BH; variable set equal to the value of the RECORD_TYPE returned by FIND_TYPE

CATEGORY: global; floating point number given value from the parameter set; one of the two components of CHARACTERISTIC

CCD: global; an element of the structure COUNTY_CCD_TYPE

CCD: READ_PARM_SET; a character string whose value is set in the input stream via a GET FILE (INPUT) DATA

CCD: SEARCH_4BP/SEARCH_4BH; numeric variable representing the CCD;s in each county

CCT_PTR: global; a pointer (see COUNTY_CCD_TYPE)

CHAR: TALLY; parameter; a vector element of CHARACTERISTIC

CHAR_HEADER: SEARCH_4BP/SEARCH_4BH; character string used in labeling output

CHARACTERISTIC: READ_PARM_SET; character string composed of CATEGORY and BASE

CHAR_HEAD: SEARCH_4BP/SEARCH_4BH; file (keyed, sequential, indexed) of characteristics

COLUMNS: global; an element of the structure BOUNDS OVLY

COMMAS: READ_PARM_SET; a character string initialized ,0,0,... ; used to pad the character strings in GET STRINGS for arrays; insures that zeroes are entered in unused positions of the arrays

COMPUTED_LEVEL: SEARCH_4BP/SEARCH_4BH; the ratio of CATEGORY TO BASE

COP: TALLY; cumulative offset pointer; used to index ITEMS_AND_OFFSET for a given characteristic; computed as

$$1 + \sum_{i=0}^{CHAR-1} TABLE\_SEGMENTS\ (i,2)*2$$

COUNTY: global; an element of the structure COUNTY_CCD_TYPE

COUNTY: READ_PARM_SET; a character string whose value is set in the input stream via a GET FILE (INPUT) DATA

COUNTY: SEARCH_4BP/SEARCH_4BH; numeric variable representing a county

COUNTY_CCD_TYPE: global; a structure overlaid on rows of KEY_ARRAY to reduce subscripting; its elements are used in READ_ISAM4BP/READ_ISAM_4BH as a key to the indexed file ISAM4BP/ ISAM4BH, in various on units, and in labeling the output

COUNTY_NAME: global; an array composed of all county names

END: READ_PARM_SET; variable denoting column in which the end of the HEADINGS for a particular table is found

EXIT: SEARCH_4BP/SEARCH_4BH; statement label

FIND_TYPE: Procedure; used to determine if the specified table is within the limits of the tables which are a part of a specified RECORD_TYPE

FOUND: SEARCH_4BH; counts the number of successful searches for a particular CHARACTERISTIC

HEADER_KEY: global; character string used as a key to index table headings in the headings file

HEADER_POINTER: OUTPUT_TABLE; pointer to TEXT

HEADINGS: global; file (keyed, sequential, indexed) of table headings

HOLD: SEARCH-4BH; variable set equal to the value returned by the PROCEDURE TALLY (TOTAL)

IGNORE: RECORD_EXISTS; condition signaled if the table that was requested does not exist for a particular record type

INPUT: READ_PARM_SET; input file

ITEM_PTR: TALLY; pointer; contains address of the number of items comprising a given characteristic and their offset from the beginning of the table in which it appears

ITEMS: TALLY; an element of the structure ITEMS_OVLY

ITEMS_AND_OFFSET: TALLY; a one dimensional array; its entries indicate the number of items that comprise a characteristic and the offset from the beginning of the table that they appear

ITEMS_OFFSET: TALLY; an element of the structure ITEMS_OVLY

ITEMS_OVLY: TALLY; based structure overlaid on the rows of ITEMS_AND_OFFSET to reduce subscripting

KEY_ARRAY: global; an array aggregate composed of KEY_COUNTY, KEY_CCD, and KEY_TYPE each of which is given values read in from the parameter set

KEY_CCD: global; an element of the array aggregate KEY_ARRAY

KEY_COUNTY: global; an element of the array aggregate KEYARRAY

KEY_TYPE: global; an element of the array aggregate KEY_ARRAY

LAST_REC: RECORD_EXISTS; a character string representing the last record retrieved from ISAM4BP/ TISAM4BH

LEFT: OUTPUT_TABLE; the number of columns left on a line after 9 rows of a table are fitted to the line; LEFT = 131 - (NUMBER OF COLUMNS/LINE)*11

LEN: OUTPUT_TABLE; fixed point number used to indicate the length of the header text currently being output.

LEVEL: READ_PARM_SET; a character string whose value is set in the input stream via a GET FILE (INPUT) DATA

LIMITS: FIND_TYPE; denotes the limits of the tables of each RECORD_TYPE

LINE: OUTPUT_TABLE; an array where the pointers into the header record are stored

MAX_CCDS; global; initialized to 50 indicating that 50 is the maximum number of CCD's that will be outputted; value can be changed via the PARM card

MAX_CHARS: global; initialized to 68 indicating the maximum number of characteristics

MAX_KEYS: global; initialized to 100 indicating the maximum number of CCD's that one can aggregate or search

NEXT_CCD: SEARCH_4BH; statement label indicating that a particular CCD does not exist for a specified county

OUTPUT_TABLE: PROCEDURE for outputting a table for aggregating or building a table

PERCENT: global; floating point number given value in the parameter set; the level at which a CCD will satisfy a search request

PIECES: OUTPUT_TABLE; if the number of columns for a particular table will not fit on one line, PIECES denotes the number of columns that is to be placed on a following line

PROGRAM_PARMS: global; parameter, character string

READ_PARM_SET: procedure where INPUT file is read in order to set parameter values

RECORD_DOESNT_EXIST: RECORD_EXISTS; statement label indicating that the record type is invalid for a particular CCD or that the CCD specified does not exist in the county specified

RECORD_EXISTS: PROCEDURE for determining whether or not TABLE_NUMBER is valid for the RECORD_TYPE, the CCD exists for the county specified, and the record you are currently working with is a new record

RECORD_POINTER: pointer to current record in the buffer

RECORD_TYPE: READ_PARM_SET; character string whose value is set in the input stream via a GET FILE (INPUT) DATA

RECOVER: READ_PARM_SET; statement label

ROWS: global; an element of the structure BOUNDS_ONLY

SEARCH: READ_PARM_SET; a character string whose value is set in the input stream via a GET FILE (INPUT) DATA

SEARCHING: global; bit variable given value from the parameter set; used to direct program flow

SEG_OVLY: SEARCH_4BP/SEARCH 4BH; based structure overlaid on the rows of TABLE_SEGMENTS to reduce subscripting

SEG_PTR: TALLY; pointer; contains address of the row of TABLE_SEGMENTS corresponding to the characteristic in question

SEGMENTS: SEARCH_4BP/SEARCH_4BH; an element of the structure SEG_OVLY

S_TABLE: OUTPUT TABLE; an array of certain table numbers and the number of columns contained in each table

SYSPRINT: global; file name

SUPPRESSION: RECORD_EXISTS; a condition signaled if it is determined that any of the data in a table is suppressed

TABLE: global; an array aggregate built from ISAM4BP/ISAM4BH records

TABLE_ARRAY: global; an array aggregate given values from the parameter set indicating the tables requested

TABLE_NUMBER: global; indicates the value of the entry currently being worked with

TABLE_OFFSET: global; an element of the structure BOUNDS_OVLY

TABLE_SEGMENTS: TALLY; a two dimensional array each row of which corresponds to some characteristic. The first column of each row indicates the table the characteristic is found in and the second column indicates how many segments of the table comprise the characteristic

TABLES: READ_PARM_SET; a character string whose value is set in the input stream via a GET FILE (INPUT) DATA

TALLY: PROCEDURE returns the SUM of the values of a specified characteristic

TAXT: global; based character string whose pointer values are given by a SET WHEN a READ is done on HEADINGS

TN: FIND_TYPE; a parameter

TOTAL: TALLY; used to sum the values of a particular characteristic

TYPE: global; an element of the structure COUNTY_CCD_TYPE

TYPE_NAME: OUTPUT_TABLE; an array of character strings giving the full name of each record type

VALID_TYPES: READ_PARM_SET; an array of character strings initialized to the RECORD_TYPES present in fourth-count data

VALUE: TALLY; the value of a specified characteristic that is being added to TOTAL

WHICH_TABLE: SEARCH_4BH; an element of the structure SEG_OVLY

VARIABLES SPECIFIC TO CENSLIST

ISAM4BP: global; indexed, sequential, keyed file of fourth count population data.

POP_REC: global; based character string whose pointer variable is given by a SET when a read is done on ISAM4BP

SEARCH_4BP: procedure used when searching for a particular characteristic

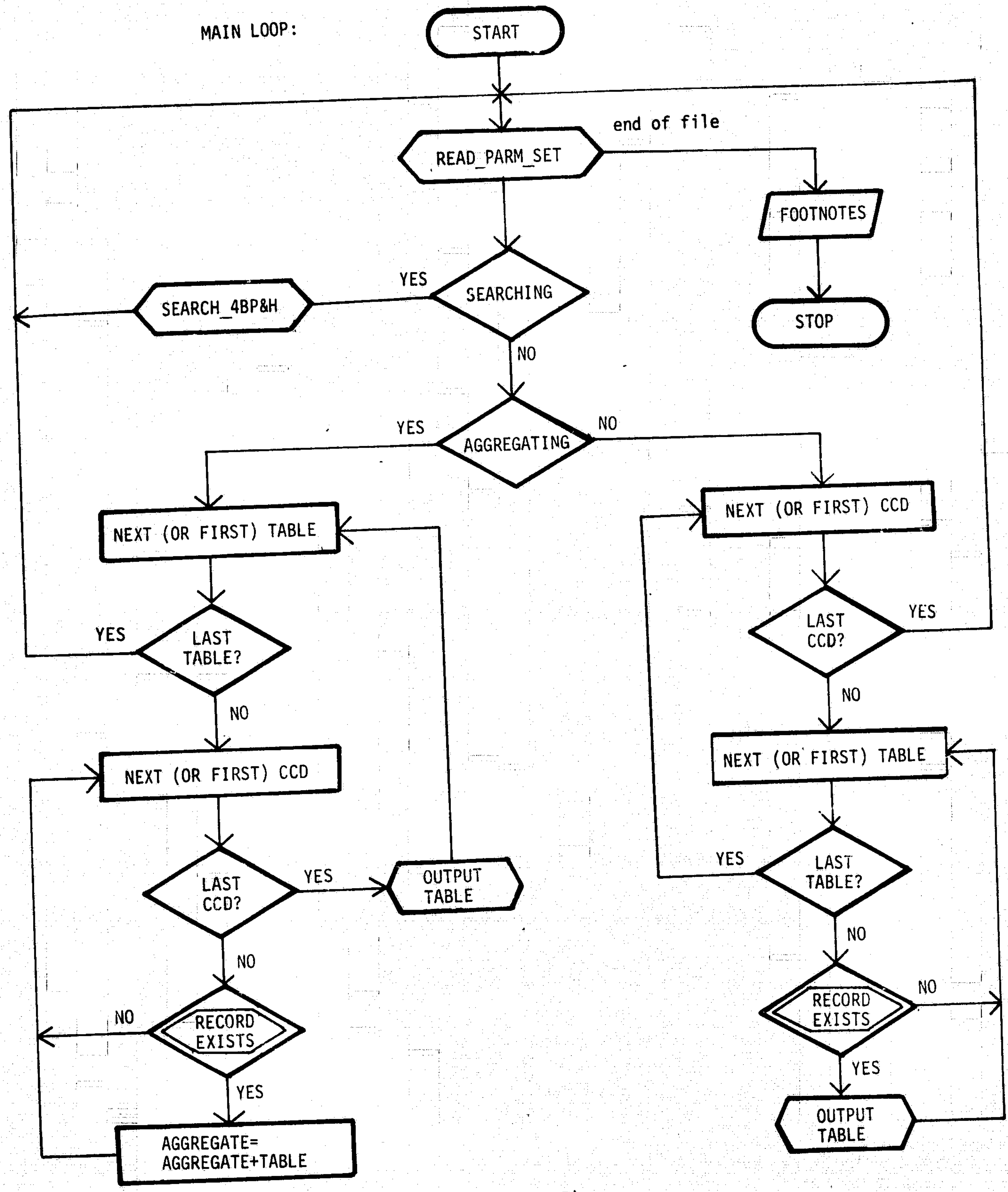
VARIABLES SPECIFIC TO HOUSLIST

ISAM4BH: global; indexed, sequential, keyed file of fourth count housing data

REC: global; based character string whose pointer value is given by a SET when a READ is done on ISAM4BH.

SEARCH_4BH: procedure used when searching for a particular characteristic.

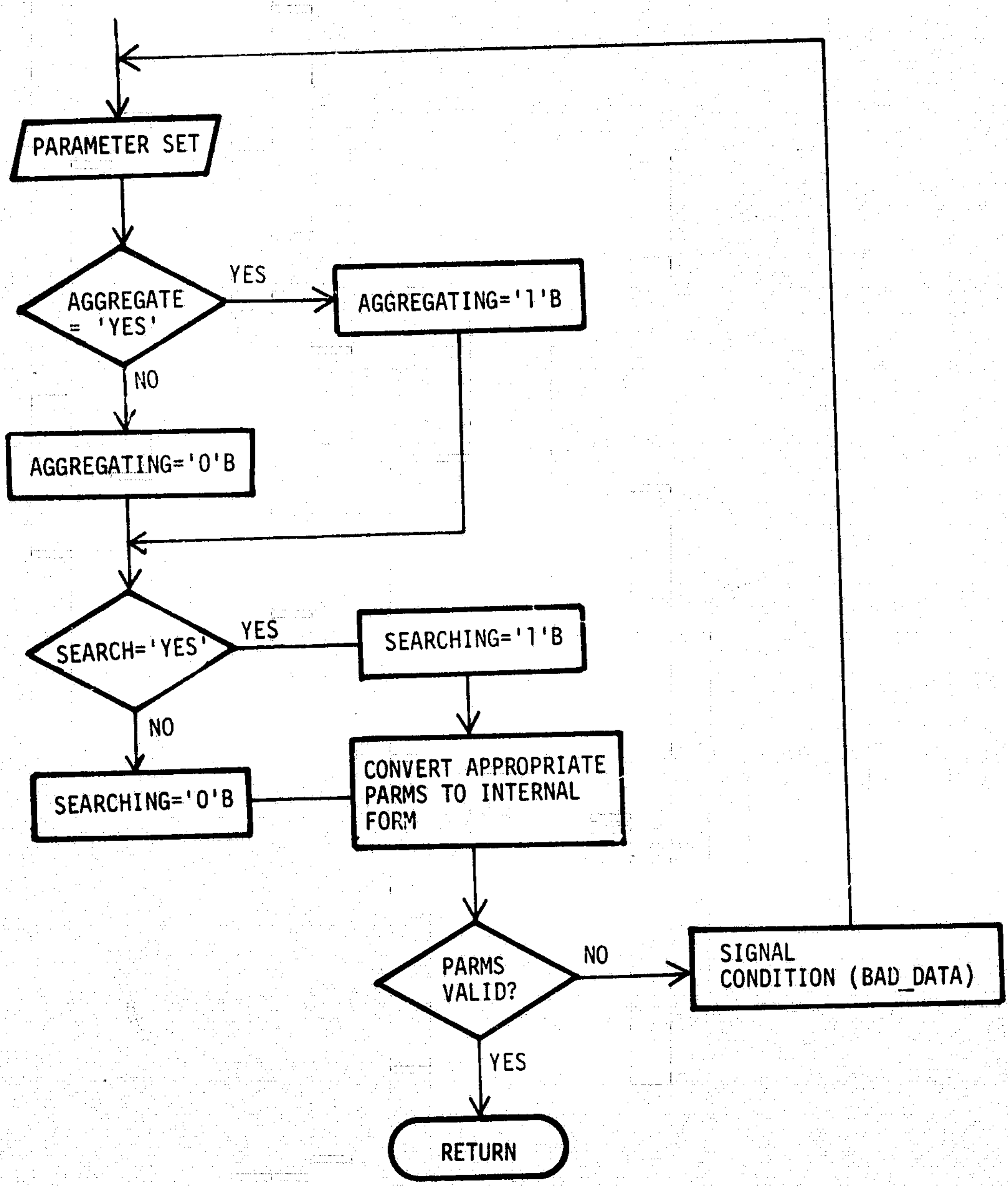
MAIN LOOP:



PARAMETERS: MAX_CCDS,MAX_KEYS (VIA THE EXEC STMT)

/* ENCOMPASSES ≅ STMTS 8 → 27 */

READ_PARM_SET:

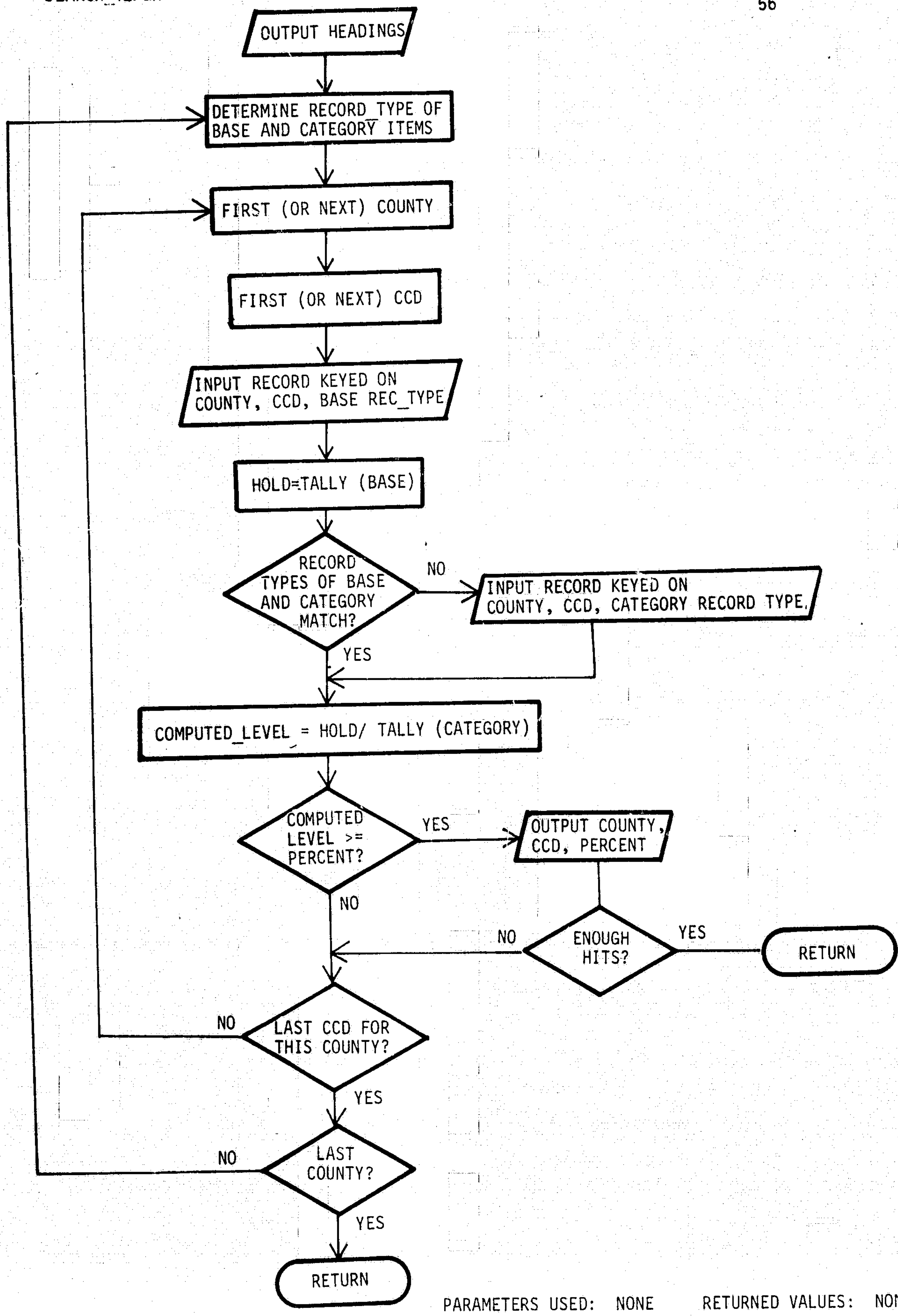


PARAMETERS: NONE

GLOBAL VARIABLES USED: HEADINGS, HEADER_POINTER, TEXT, AGGREGATING, SEARCHING, CATEGORY, BASE, PERCENT, MAX_CHARS, KEY_ARRAY, TABLE ARRAY

RETURNED VALUES: NONE SPECIFICALLY, BESIDES CERTAIN GLOBAL VARIABLES WHICH ARE GIVEN VALUES

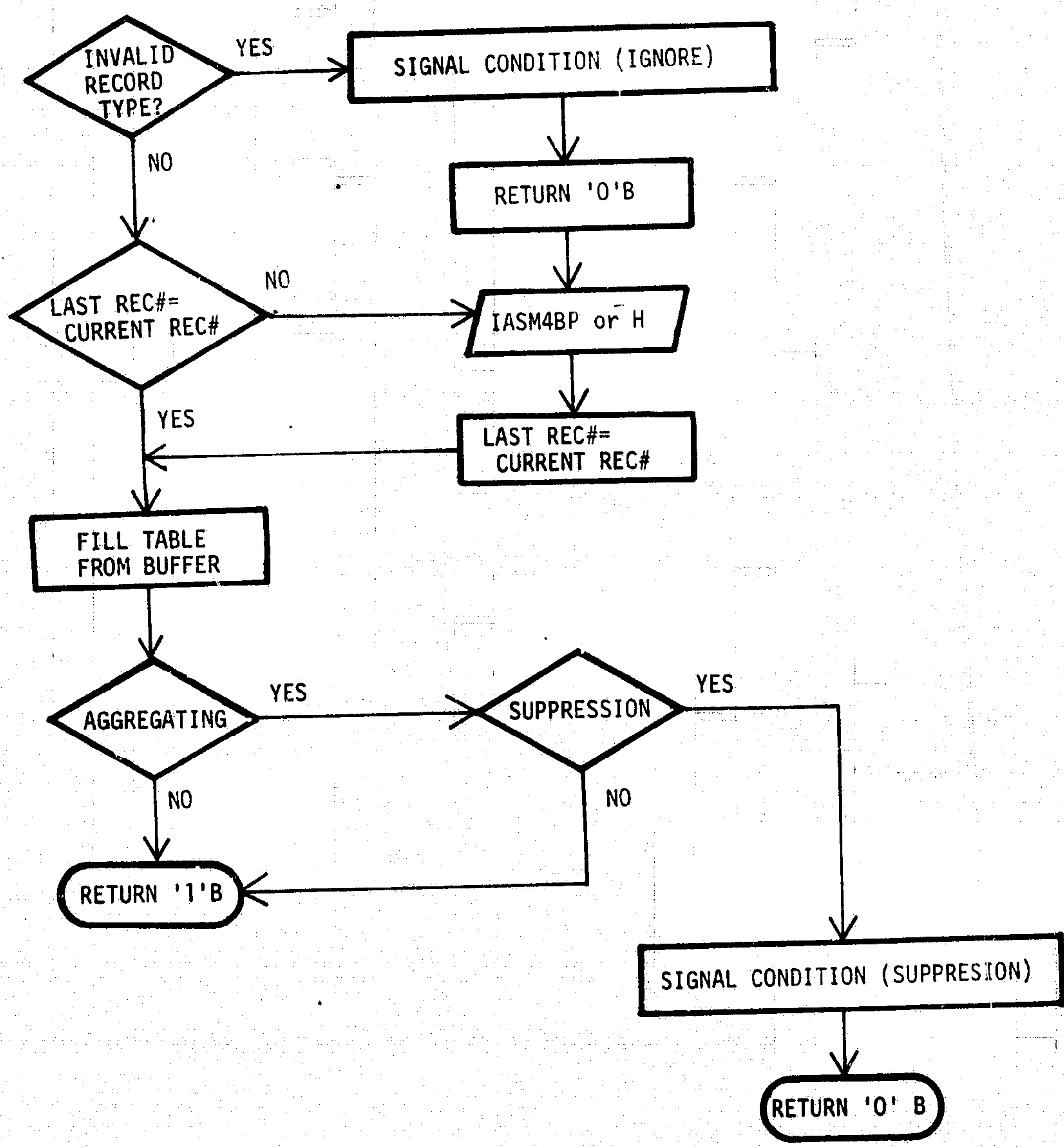
SEARCH_4BP&H:



PARAMETERS USED: NONE RETURNED VALUES: NONE

GLOBAL VARIABLES USED: CATEGORY, BASE, HEADER KEY

RECORD EXISTS:

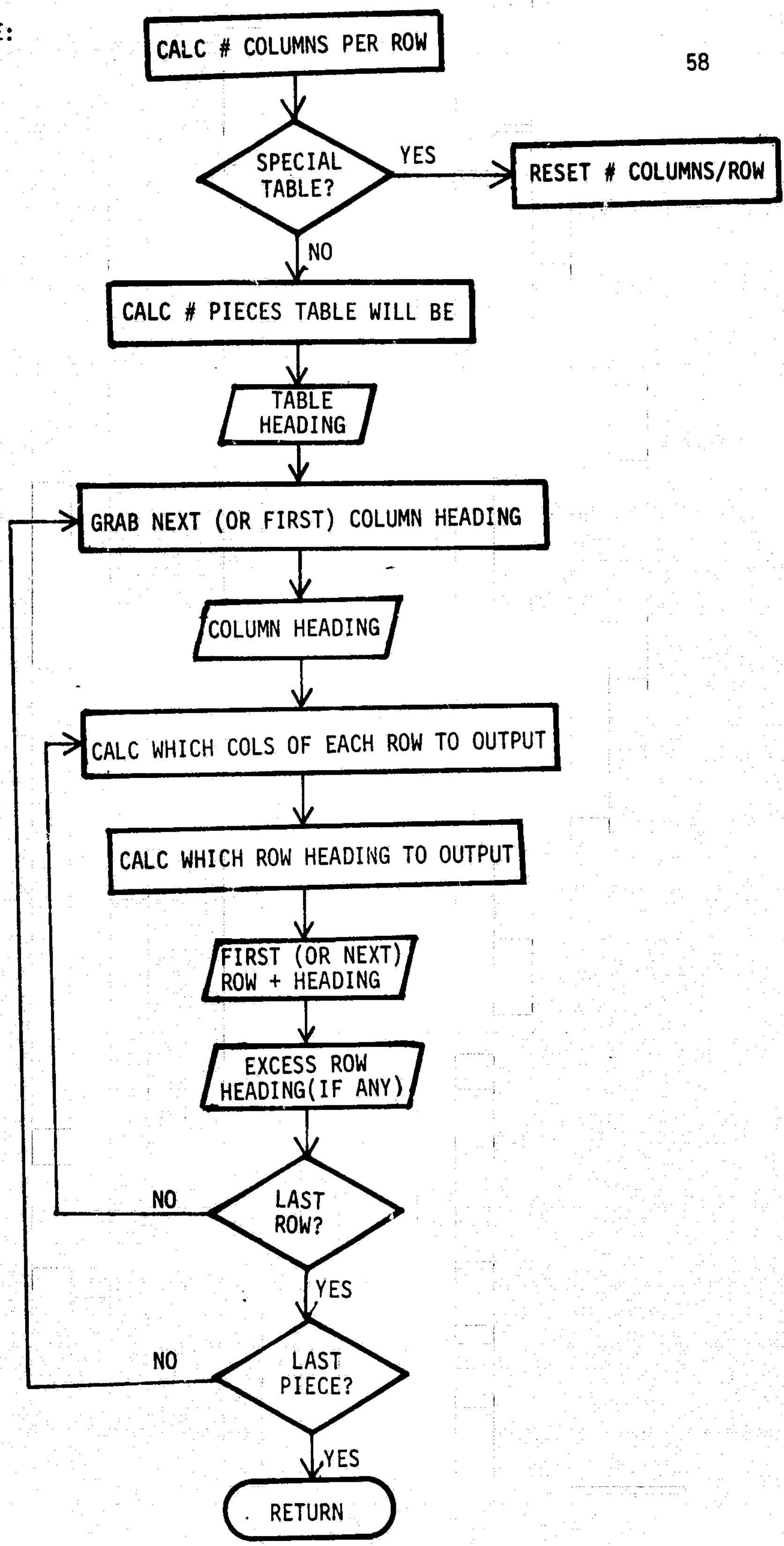


PARAMETERS: NONE

GLOBAL VARIABLES USED: AGGREGATING, COUNTY-CCD-TYPE, TABLE_NUMBER, ISAM4BPorH, RECORD_POINTER, POP_REC(or REC), BOUNDS, BOUNDS_PTR

RETURNED VALUES: 1 or 0, depending on whether or not a record for a particular COUNTY-CCD-TYPE exists.

OUTPUT_TABLE:



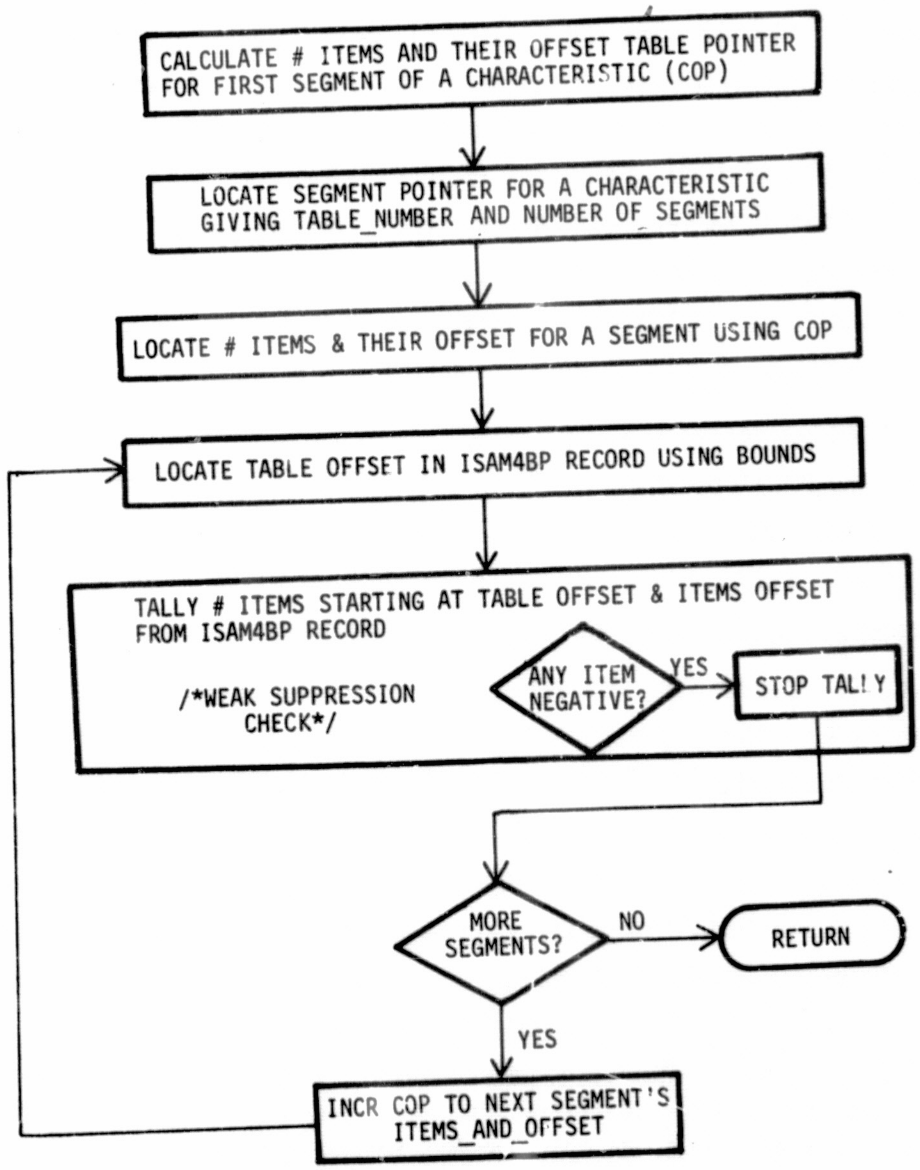
PARAMETERS: ANY_TABLE (I.E. TABLE OR AGGREGATE)

GLOBAL VARIABLES USED: HEADER KEY, HEADINGS, TEXT, HEADER_PTR, TABLE_NUMBER, AGGREGATING, COUNTY_NAME, KEY CCD, TYPE_NAME, MAX_CCDS, KEY_TYPE, ROWS, COLUMNS

RETURNED VALUES: NONE

TALLY: PARAMETER: CHAR (a vector element of characteristic; e.g. category)

GLOBAL VARIABLES USED: BOUNDS, BOUNDS_ONLY, POP_REC



RETURNED VALUES: A floating joint number representing the tally of a particular characteristic.

CENSLIST SOURCE LISTING

```
 /**
 (SUBSCRIPTRANGE,STRINGRANGE):
 **/
CENSUS_LIST: PROC(PROGRAM_PARMS) OPTIONS(MAIN) REORDER;
DECLARE (MAX_CCDS INIT(50), MAX_KEYS INIT(100), MAX_CHARS INIT(42))
                                                       FIXED BIN(15),
        PROGRAM_PARMS CHAR(100) VARYING,
        ((AGGREGATING, SEARCHING) BIT(1),
        VALID_TYPES(5) PIC'99' INIT('01','02','03','04','13'),
        ONEB BIT(1) INIT('1'B),
        (TABLE_ARRAY(127),I,J,K,L,TABLE_NUMBER) FIXED BIN(15),
        ((TABLE, AGGREGATE)(42,7) INIT((294)0),
        CATEGORY,BASE,PERCENT) FLOAT) STATIC,
        TEXT CHAR(3000) BASED(HEADER_POINTER),
        HEADER_KEY PIC'999',
        SEARCH_KEY CHAR(7),
        (ISAM4BP, HEADINGS, CHARHEAD) FILE RECORD SEQUENTIAL KEYED
                              ENVIRONMENT(INDEXED BUFFERS(1)),
        POP_REC CHAR(9495) BASED(RECORD_POINTER),
        1 KEY_ARRAY(MAX_KEYS) CONTROLLED,
          2 KEY_COUNTY PIC'99',
          2 KEY_CCD PIC'999',
          2 KEY_TYPE PIC'99',
        1 COUNTY_CCD_TYPE BASED(CCT_PTR),
          2 COUNTY PIC'99',
          2 CCD PIC'999',
          2 TYPE PIC'99',
        (ADDR, ANY, CEIL, DATAFIELD, HBOUND, MIN, MOD, STRING,
             SUBSTR) BUILTIN;

DECLARE COUNTY_NAME(67)                CHAR(10) VARYING INIT('AUTAUGA','BA
LDWIN','BARBOUR','BIBB','BLOUNT','BULLOCK','BUTLER','CALHOUN','CHAMBERS
','CHEROKEE','CHILTON','CHOCTAW','CLARKE','CLAY','CLEBURNE','COFFEE','C
OLBERT','CONECUH','COOSA','COVINGTON','CRENSHAW','CULLMAN','DALE','DALL
AS','DE KALB','ELMORE','ESCAMBIA','ETOWAH','FAYETTE','FRANKLIN','GENEVA
','GREENE','HALE','HENRY','HOUSTON','JACKSON','JEFFERSON','LAMAR','LAUD
ERDALE','LAWRENCE','LEE','LIMESTONE','LOWNDES','MACON','MADISON','MAREN
GO','MARION','MARSHALL','MOBILE','MONROE','MONTGOMERY','MORGAN','PERRY'
,'PICKENS','PIKE','RANDOLPH','RUSSELL','ST. CLAIR','SHELBY','SUMTER','T
ALLADEGA','TALLAPOOSA','TUSCALOOSA','WALKER','WASHINGTON','WILCOX','WIN
STON')  STATIC;

DECLARE 1 BOUNDS_OVLY BASED(BOUNDS_PTR),
          2 (ROWS,COLUMNS,TABLE_OFFSET) FIXED BIN(15),
        BOUNDS(127,3) FIXED BIN(15) INIT(  1, 1,      0,  2, 1,      1,
                 1, 1,      3,  2, 1,      4,  2, 1,      6,  7, 1,      8,
                 3, 1,     15,  6, 2,     18,  6, 2,     30,  1, 1,     42,
                 1, 1,     43,  4, 1,     44,  4, 1,     48,  2, 1,     52,
```

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CENSLIST SOURCE LISTING

```
                  2, 1,    54,  2, 2,    56, 27, 2,    60, 12, 1,   114,
                  3, 3,   126,  6, 2,   135,  2, 1,   147, 33, 2,   149,
                 13, 2,   215,  4, 1,   241,  5, 3,   245,  5, 1,   260,
                  7, 1,   265, 10, 1,   272,  7, 1,   282,  2, 3,   289,
                  4, 1,   295,  3, 1,   299,  2, 3,   302,  8, 1,   308,
                 26, 1,   316,  9, 1,   342,  7, 1,   351, 15, 1,   358,
                  9, 1,   373,  2, 1,   382,  4, 2,   384, 10, 2,   392,
                  2, 2,   412,  4, 3,   416,  5, 1,   428,  6, 1,   433,
                  2, 1,   439,  3, 1,   441,  3, 1,   444,  4, 1,   447,
                  7, 1,   451,  7, 2,   458,  4, 2,   472,  9, 2,   480,
                  8, 2,   498,  4, 2,   514,  6, 2,   522, 42, 1,   534,
                 27, 1,   576,  5, 1,   603,  5, 1,   608, 41, 2,   613,
                  2, 2,   695,  7, 3,   699,  7, 4,   720,  7, 1,   748,
                  7, 4,   755, 13, 2,   783, 14, 2,   809, 10, 2,   837,
                  2, 2,   857,  2, 2,   861,  3, 2,   865,  2, 2,   871,
                 15, 1,   875, 15, 1,   890, 14, 2,   905, 14, 7,   933,
                 13, 3,  1031,  6, 2,  1070,  6, 2,  1082,  8, 1,  1094,
                  1, 1,  1102,  3, 4,  1103,  2, 4,  1115,  2, 1,  1123,
                  3, 2,  1125,  2, 1,  1131,  2, 2,  1133,  2, 1,  1137,
                  1, 1,  1139,  2, 1,  1140,  2, 2,  1142,  3, 1,  1146,
                  3, 1,  1149,  2, 2,  1152,  2, 1,  1156,  4, 4,  1158,
                  2, 2,  1174,  1, 1,     0, 30, 2,     1,  1, 1,    61,
                  2, 1,    62,  2, 1,    64,  3, 1,    66, 12, 1,    69,
                  2, 1,    81,  2, 1,    83,  8, 1,    85,  5, 1,    93,
                  6, 1,    98,  2, 7,   104,  5, 1,   118, 10, 1,   123,
                  4, 1,   133, 12, 1,   137, 14, 1,   149,  7, 1,   163,
                  4, 1,   170, 14, 2,   174, 15, 2,   202, 10, 2,   232,
                  5, 2,   252,  1, 1,   262,  1, 1,   263,  1, 1,   264,
                  1, 1,   265) STATIC;

   GET STRING(PROGRAM_PARMS||';') DATA(MAX_CCDS,MAX_KEYS);
   ALLOCATE KEY_ARRAY;
   OPEN FILE(SYSPRINT) LINESIZE(132);

DO WHILE(ONEB);
CALL READ_PARM_SET;
IF SEARCHING THEN CALL SEARCH_4BP;
ELSE
   IF AGGREGATING
      THEN DO K = 1 TO HBOUND(TABLE_ARRAY,1) WHILE(TABLE_ARRAY(K)¬=0);
              AGGREGATE = 0;
              TABLE_NUMBER = TABLE_ARRAY(K);
              DO L = 1 TO MAX_KEYS WHILE(KEY_TYPE(L) ¬= '00');
                 CCT_PTR = ADDR(KEY_ARRAY(L));
                 IF RECORD_EXISTS THEN AGGREGATE = AGGREGATE + TABLE;
                 END;
              CALL OUTPUT_TABLE(AGGREGATE);
              END;

      ELSE DO L = 1 TO MAX_KEYS WHILE(KEY_TYPE(L) ¬= '00');
```

CENSLIST SOURCE LISTING

```
              CCT_PTR = ADDR(KEY_ARRAY(L));
              DO K = 1 TO HBOUND(TABLE_ARRAY,1)
                                    WHILE(TABLE_ARRAY(K) ¬= 0);
                 TABLE_NUMBER = TABLE_ARRAY(K);
                 IF RECORD_EXISTS THEN CALL OUTPUT_TABLE(TABLE);
                 END;
              END;
END;

RECORD_EXISTS: PROC RETURNS(BIT(1));
DECLARE LAST_REC CHAR(7) STATIC;

   ON KEY(ISAM4BP) BEGIN; PUT FILE(SYSPRINT) EDIT
        ('*RECORD TYPE SPECIFIED DOES NOT EXIST FOR THIS CCD, OR CCD SP
ECIFIED DOES NOT EXIST IN COUNTY SPECIFIED') (COL(1),A);
        IF AGGREGATING THEN PUT FILE(SYSPRINT) EDIT
              ('*COUNTY-CCD-RECORD_TYPE ',COUNTY,'-',CCD,'-',
            TYPE,' OMMITTED FROM THIS AGGREGATION')(COL(1),(7)(A));
                       ELSE PUT FILE(SYSPRINT) EDIT
               ('*TABLE ',TABLE_NUMBER,' HAS BEEN OMITTED FOR COUNTY-CC
D-RECORD_TYPE ',COUNTY,'-',CCD,'-',TYPE)
                                            (COL(1),A,F(3),(6)(A));
        GO TO RECORD_DOESNT_EXIST;
        END;

   ON CONDITION(SUPPRESSION) BEGIN;
        IF AGGREGATING THEN PUT FILE(SYSPRINT) EDIT
              ('*COUNTY-CCD-RECORD_TYPE ',COUNTY,'-',CCD,'-',
                 TYPE,' OMITTED FROM THIS AGGREGATION BECAUSE OF DATA
SUPPRESSION')  (COL(1),(7)(A));
                       ELSE PUT FILE(SYSPRINT) EDIT
               ('*TABLE ',TABLE_NUMBER,' OMITTED BECAUSE OF DATA SUPPRE
SSION FOR COUNTY-CCD-RECORD_TYPE ',COUNTY,'-',CCD,'-',TYPE)
                                                 (COL(1),A,F(3),(6)(A));
        GO TO RECORD_DOESNT_EXIST;
        END;

   ON CONDITION(IGNORE) BEGIN; PUT FILE(SYSPRINT) EDIT
        ('*TABLE ',TABLE_NUMBER,' DOES NOT EXIST FOR RECORD_TYPE ',
             TYPE,' IN COUNTY-CCD ',COUNTY,'-',CCD,'.  IGNORED.')
                                    (COL(1),A,F(3),(7)(A));
   GO TO RECORD_DOESNT_EXIST;
   END;

   IF TABLE_NUMBER>99&TYPE¬='13' | TABLE_NUMBER<99&TYPE='13'
      THEN SIGNAL CONDITION(IGNORE);
   IF LAST_REC ¬= STRING(COUNTY_CCD_TYPE)
      THEN DO; READ FILE(ISAM4BP) KEY(STRING(COUNTY_CCD_TYPE))
                                                 SET(RECORD_POINTER);
```

CENSLIST SOURCE LISTING

```
            LAST_REC = STRING(COUNTY_CCD_TYPE);
            END;
   BOUNDS_PTR = ADDR(BOUNDS(TABLE_NUMBER,1));
   GET STRING(POP_REC) EDIT
            (((TABLE(I,J) DO I = 1 TO ROWS) DO J = 1 TO COLUMNS))
            (X(TABLE_OFFSET*8),(ROWS*COLUMNS)(F(8)));
   IF TABLE(1,1) < 0 THEN SIGNAL CONDITION(SUPPRESSION);
   RETURN('1'B);

RECORD_DOESNT_EXIST:  RETURN('0'B);
END RECORD_EXISTS;

READ_PARM_SET:  PROC;
DECLARE INPUT FILE STREAM,
        (((COUNTY,CCD,RECORD_TYPE,TABLES) CHAR(320),
/*      IDEALLY THE ABOVE SHOULD BE APPROX 3*MAX_KEYS                       */
        LEVEL CHAR(5), CHARACTERISTIC CHAR(8) ) STATIC,
        (AGGREGATE, SEARCH) CHAR(3) ) VARYING,
        END PIC'9999',
        COMMAS CHAR(254) INIT((127)',0');
/*      THE ABOVE SHOULD BE CLOSE TO 2*MAX_KEYS                             */

   ON ENDFILE(INPUT)
   BEGIN;
 IF ¬SEARCHING THEN DO;
        READ FILE(HEADINGS) KEY('128') SET(HEADER_POINTER);
        GET STRING(TEXT) EDIT(END) (P'9999');
        PUT SKIP(2) FILE(SYSPRINT) EDIT('FOOTNOTES',
             (SUBSTR(TEXT,I,80) DO I = 5 BY 80 WHILE(I<END)))
                (COL(50),A,(50)(COL(25),A(80)));
        END;
   STOP;
   END;

   ON NAME(INPUT) BEGIN; PUT FILE(SYSPRINT) EDIT
        ('*UNRECOGNIZABLE INPUT - ',DATAFIELD,' - FOUND IN REQUEST SET.
 CHECK YOUR SPELLING AND PUNCTUATION.  REQUEST SET IGNORED.')((3)(A));
        GO TO RECOVER;
        END;

   ON CONDITION(BAD_DATA) BEGIN;
        PUT FILE(SYSPRINT) EDIT('*UNREAL COUNTY, CCD, RECORD_TYPE, CHAR
 ACTERISTIC, LEVEL, OR TABLE NUMBER FOUND.  REQUEST IGNORED.')
                                                             (COL(1),A);

        GO TO RECOVER;
        END;

  RECOVER:
    GET FILE(INPUT) DATA(COUNTY,CCD,RECORD_TYPE,TABLES,AGGREGATE,SEARCH,
                              CHARACTERISTIC,LEVEL);
```

CENSLIST SOURCE LISTING

```
    IF AGGREGATE = 'YES' THEN AGGREGATING = 1B;
                              ELSE AGGREGATING = 0B;
    IF SEARCH = 'YES'
       THEN DO; SEARCHING=1B;
                GET STRING(CHARACTERISTIC) LIST(CATEGORY, BASE);
                GET STRING(LEVEL) LIST(PERCENT);
                PERCENT = PERCENT * 1E-2;         /* SCALE */
                IF CATEGORY<=0|CATEGORY>MAX_CHARS|
                   BASE<=0|BASE>MAX_CHARS|
                   PERCENT<0|PERCENT>1
                   THEN SIGNAL CONDITION(BAD_DATA);
                END;
       ELSE DO; SEARCHING=0B;
                GET STRING(COUNTY||COMMAS) LIST(KEY_COUNTY);
                GET STRING(CCD||COMMAS) LIST(KEY_CCD);
                GET STRING(RECORD_TYPE||COMMAS) LIST(KEY_TYPE);
                GET STRING(TABLES||COMMAS) LIST(TABLE_ARRAY);
                DO I = 1 TO MAX_KEYS WHILE(KEY_TYPE(I) ¬= '00');
                   IF KEY_COUNTY(I) > '67' |
                      MOD(KEY_CCD(I),5) ¬= 0 |
                      ¬ANY(KEY_TYPE(I) = VALID_TYPES)
                      THEN SIGNAL CONDITION(BAD_DATA);
                   END;
                   IF ANY(TABLE_ARRAY > 127)
                      THEN SIGNAL CONDITION(BAD_DATA);
                END;
END READ_PARM_SET;

OUTPUT_TABLE: PROC(ANY_TABLE);
DECLARE (LINE(0:64),LEFT,LEN,PIECES,C_WIDE,I,J,K,L,U) FIXED BIN(15),
        S_TABLE(1,2) FIXED BIN(15) INIT(0, 0),
        ANY_TABLE(*,*) FLOAT,
        TYPE_NAME(13) CHAR(27) VARYING INIT('TOTAL POPULATION',
                'CAUCASIAN POPULATION','NEGRO POPULATION',
                'SPANISH-AMERICAN POPULATION',(8)(0)'','ALLOCATIONS');

                /* MAX COLUMNS PER ROW IS NINE */
    C_WIDE = MIN(COLUMNS,9);
                /* SEE IF THE DIMENSIONS OF THE TABLE CHANGE FOR OUTPUT*/
    DO I = 1 TO HBOUND(S_TABLE,1);
         IF TABLE_NUMBER=S_TABLE(I,1) THEN C_WIDE = S_TABLE(I,2);
         END;
                /* FIND THE NUMBER OF DIFFERENT PIECES                   */
                /* (IN ROWS C_WIDE BLOCKS) THAT WILL BE OUTPUT           */
    PIECES = CEIL(COLUMNS/C_WIDE);
                /* GRAB THE HEADING RECORD */
    HEADER_KEY = TABLE_NUMBER;
    READ FILE(HEADINGS) KEY(HEADER_KEY) SET(HEADER_POINTER);
    GET STRING(TEXT) EDIT((LINE(I) DO I=0 TO ROWS+PIECES)) (F(4));
```

CENSLIST SOURCE LISTING

```
    IF AGGREGATING THEN PUT SKIP(3) FILE(SYSPRINT) EDIT
         ('TABLE ',TABLE_NUMBER,' AS AN AGGREGATE OF THESE COUNTY-CCD-RE
CORD_TYPES',
         (COUNTY_NAME(KEY_COUNTY(I)),'-',KEY_CCD(I),'-',
           TYPE_NAME(KEY_TYPE(I))
               DO I = 1 TO MAX_CCDS WHILE(KEY_TYPE(I) ¬= 0)))
      (COL(1),A,F(3),A,(MAX_CCDS)(COL(MOD(I-1,4)*33+1),A,A,P'ZZ9',A,A));
                    ELSE PUT SKIP(3) FILE(SYSPRINT) EDIT
                         ('TABLE ',TABLE_NUMBER,COUNTY_NAME(COUNTY),
                         ' COUNTY, CENSUS DIVISION ',CCD,', ',
                         TYPE_NAME(TYPE))
                              (COLUMN(1),A,F(3),X(2),A,A,P'ZZ9',A,A);
    DO K = 1 TO PIECES;
         LEN = LINE(1) - LINE(0);
            /* FOR EACH PIECE OF THE TABLE,                                  */
            /*                  WRITE THE COLUMN HEADINGS                     */
         PUT FILE(SYSPRINT) EDIT(SUBSTR(TEXT,LINE(0),LEN))
                                  (COL(1),A);
            /* FIGURE OUT WHICH COLUMMS OF THIS ROW TO OUTPUT                */
         L = (K-1)*C_WIDE + 1;
         U = MIN(K*C_WIDE,COLUMNS);
         LEFT = 131 - (U-L+1) * 11;
         DO I = 1 TO ROWS;
             LEN = LINE(I+1) - LINE(I);
             PUT FILE(SYSPRINT) EDIT((ANY_TABLE(I,J) DO J=L TO U),
                                           SUBSTR(TEXT,LINE(I),LEN))
                             (COL(2),(U-L+1 )(F(8),X(3)),A(LEFT));
              /* FOR THE ROW HEADING THAT WON'T FIT ON ONE LINE */
             IF LEN>LEFT THEN PUT FILE(SYSPRINT) EDIT
                 (SUBSTR(TEXT,LINE(I)+LEFT,LEN-LEFT))
                                  (COL((U-L+1)*(8+3)+2),A);
             END;
         END;
END OUTPUT_TABLE;

SEARCH_4BP: PROC;
DECLARE (COUNTY, CAT_TYPE, BASE_TYPE) PIC'99',
         CCD PIC '999',
         (HOLD, COMPUTED_LEVEL) FLOAT,
         FOUND FIXED BINARY INIT(0),
         CHAR_HEADER CHAR(80) VARYING,
         1 SEG_OVLY BASED(SEG_PTR),
           2 (WHICH_TABLE, SEGMENTS) FIXED BIN(15),
/*  IMPORTANT - THE ORDER OF ITEMS IN THIS ARRAY MUST BE CONSISTENT  */
/*  WITH THE ORDER OF ITEMS IN ITEMS_AND_OFFSET;  THE ROW NUMBER      */
/*  CORRESPONDS TO THE CHARACTERISTIC NUMBERS THAT ARE INPUT.        */
/*  NEW CHARACTERISTICS SHOULD BE EASY TO ADD TO THE END.            */
         TABLE_SEGMENTS(0:MAX_CHARS,2) FIXED BIN(15) INIT(
          0,   0,                /*  DUMMY - NEEDED              CHAR*/
         17,   2,                /*  0 - 18 YEARS                   1 */
```

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CENSLIST SOURCE LISTING

```
         17,    2,                  /*  19 - 44 YEARS                    2 */
         17,    2,                  /*  45 - 64 YEARS                    3 */
         17,    2,                  /*  65 -> YEARS                      4 */
         28,    1,                  /*  DIFFERENT STATE                  5 */
         35,    1,                  /*  OUT OF COUNTY                    6 */
         42,    2,                  /*  HIGH SCHOOL                      7 */
         42,    2,                  /*  COLLEGE                          8 */
         43,    2,                  /*  VOCATIONAL                       9 */
         54,    2,                  /*  LABOR FORCE                     10 */
         54,    2,                  /*  LABOR FORCE, UNEMPLOYED         11 */
         58,    1,                  /*  PROF, TECH, KIND-POPULATION     12 */
         58,    1,                  /*  CRAFTSMEN - POPULATION          13 */
         58,    1,                  /*  OPERATIVES - POPULATION         14 */
         58,    1,                  /*  SERVITUDE - POPULATION          15 */
         59,    1,                  /*  PROF, TECH, KIND - FEMALE       16 */
         59,    1,                  /*  CRAFTSWOMEN                     17 */
         59,    1,                  /*  OPERATIVES - FEMALE             18 */
         59,    1,                  /*  SERVITUDE - FEMALE              19 */
         62,    1,                  /*  AG, FOR, FISH                   20 */
         62,    1,                  /*  MINING                          21 */
         62,    1,                  /*  CONSTRUCTION                    22 */
         62,    1,                  /*  MANUFACTURING                   23 */
         62,    1,                  /*  TRANSPORTATION                  24 */
         62,    1,                  /*  WHOLESALE, RETAIL               25 */
         62,    1,                  /*  FINANCE, INSURANCE              26 */
         62,    1,                  /*  SERVICES                        27 */
         62,    1,                  /*  PUBLIC ADMIN                    28 */
         75,    1,                  /*  FAMILY INCOME < 3000            29 */
         75,    1,                  /*  FAMILY INCOME < 7000            30 */
         82,    1,                  /*  INCOME < POVERTY LEVEL          31 */
         17,    1,                  /*  (ALL) PERSONS                   32 */
         17,    2,                  /*  PERSONS > 5                     33 */
         35,    1,                  /*  PERSONS AT WORK                 34 */
         17,    2,                  /*  PERSONS > 25                    35 */
         43,    1,                  /*  16 - 64 YEARS, < 3 YRS COL      36 */
         17,    2,                  /*  PERSONS > 16                    37 */
         54,    2,                  /*  PERSONS > 16, LABOR FORCE       38 */
         58,    1,                  /*  PERSONS > 16, UNEMPLOYED        39 */
         59,    1,                  /*  FEMALES > 16, EMPLOYED          40 */
         75,    1,                  /*  (ALL) FAMILIES                  41 */
          1,    1);                 /*  AGGR $ INCOME                   42 */

DECLARE HIGHEST_CCD(67) FIXED BINARY INIT( 20,  45,  25,  20,  35,  20,
         25,  45,  30,  20,  30,  20,  30,  15,  15,  40,  25,  25,  15,
         40,  20,  55,  25,  35,  50,  30,  25,  50,  20,  20,  25,  20,
         35,  25,  40,  40, 135,  15,  40,  35,  35,  40,  25,  30,  45,
         30,  35,  40,  60,  30,  45,  40,  25,  30,  30,  25,  25,  25,
         40,  30,  50,  30,  65,  70,  25,  25,  20);

   ON KEY(ISAM4BP) GO TO NEXT_CCD;   /* IGNORE INTERRUPUTS,   */
```

CENSLIST SOURCE LISTING

```
                                        /* SINCE WE BUILD THE KEYS */
   HEADER_KEY = CATEGORY;
   READ FILE(CHARHEAD) INTO(CHAR_HEADER) KEY(HEADER_KEY);
   PUT SKIP(2) FILE(SYSPRINT) EDIT('SEARCH FOR CCD''S IN WHICH ',
        CHAR_HEADER,' AS A PERCENT OF ') (COL(1),(3)(A));
   HEADER_KEY = BASE;
   READ FILE(CHARHEAD) INTO(CHAR_HEADER) KEY(HEADER_KEY);
   PUT FILE(SYSPRINT) EDIT(CHAR_HEADER,' EXCEED ',PERCENT,'%',
        ('COUNTY      CCD' DO I = 1 TO 5))
                                      (A,A,F(5,1,2),A,COL(1),(5)(A,X(9)));

   CAT_TYPE, BASE_TYPE = '01';
   DO COUNTY = 1 TO 67;
      DO CCD = 5 BY 5 TO HIGHEST_CCD(COUNTY);
         READ FILE(ISAM4BP) KEY(COUNTY||CCD||BASE_TYPE)
                                                 SET(RECORD_POINTER);
         HOLD = TALLY(BASE);
         IF HOLD = 0 THEN COMPUTED_LEVEL = 0;
                     ELSE COMPUTED_LEVEL = TALLY(CATEGORY) / HOLD;
         IF COMPUTED_LEVEL >= PERCENT
            THEN DO; FOUND = FOUND + 1;
                     PUT FILE(SYSPRINT) EDIT(COUNTY_NAME(COUNTY),CCD,
                                                COMPUTED_LEVEL,'%')
                     (COL(MOD(FOUND-1,5)*24+1),A(10),X(2),P'ZZ9',X(2),
                                                    F(5,1,2),A);
                     IF FOUND >= MAX_CCDS THEN GO TO EXIT;
                     END;
         NEXT_CCD:
          END;
      END;
   IF FOUND = 0 THEN PUT FILE(SYSPRINT) EDIT
        ('*NO COUNTY-CCD''S MEET THE SPECIFIED LEVEL')(COL(1),A);

TALLY: PROC(CHAR) RETURNS(FLOAT);
DECLARE (CHAR, VALUE, TOTAL INIT(0)) FLOAT,
        COP FIXED BIN(15) INIT(1),
        1 ITEMS_OVLY BASED(ITEM_PTR),
          2 (ITEMS, ITEMS_OFFSET) FIXED BIN(15),
        ITEMS_AND_OFFSET(MAX_CHARS*3) FIXED BIN(15) INIT(
  11,   0,   11,  27,               /*  CHAR 1                         */
   8,  11,    8,  38,               /*  CHAR 2                         */
   5,  19,    5,  46,               /*  CHAR 3                         */
   3,  24,    3,  51,               /*  CHAR 3                         */
   4,   3,                          /*  CHAR 5                         */
   1,  24,                          /*  CHAR 6                         */
   4,   6,    4,  16,               /*  CHAR 7                         */
   2,   8,    2,  18,               /*  CHAR 8                         */
   1,   0,    1,   2,               /*  CHAR 9                         */
   2,   1,    2,  10,               /*  CHAR 10                        */
   1,   2,    1,  12,               /*  CHAR 11                        */
```

CENSLIST SOURCE LISTING

```
  6,    0,                                         /*  CHAR 12                                  */
  7,   17,                                         /*  CHAR 13                                  */
  3,   24,                                         /*  CHAR 14                                  */
  6,   35,                                         /*  CHAR 15                                  */
  5,    0,                                         /*  CHAR 16                                  */
  1,   11,                                         /*  CHAR 17                                  */
  3,   12,                                         /*  CHAR 18                                  */
  6,   20,                                         /*  CHAR 19                                  */
  1,    0,                                         /*  CHAR 20                                  */
  1,    1,                                         /*  CHAR 21                                  */
  1,    2,                                         /*  CHAR 22                                  */
 12,    3,                                         /*  CHAR 23                                  */
  5,   15,                                         /*  CHAR 24                                  */
  6,   20,                                         /*  CHAR 25                                  */
  2,   26,                                         /*  CHAR 26                                  */
 12,   28,                                         /*  CHAR 27                                  */
  1,   40,                                         /*  CHAR 28                                  */
  3,    0,                                         /*  CHAR 29                                  */
  7,    0,                                         /*  CHAR 30                                  */
  3,    0,                                         /*  CHAR 31                                  */
 54,    0,                                         /*  CHAR 32                                  */
 25,    2,    25,   29,                            /*  CHAR 33                                  */
 26,    0,                                         /*  CHAR 34                                  */
 12,   15,    12,   42,                            /*  CHAR 35                                  */
  4,    0,                                         /*  CHAR 36                                  */
 19,    8,    19,   35,                            /*  CHAR 37                                  */
  2,    1,     2,   10,                            /*  CHAR 38                                  */
 42,    0,                                         /*  CHAR 39                                  */
 27,    0,                                         /*  CHAR 40                                  */
 15,    0,                                         /*  CHAR 41                                  */
  1,    0);                                        /*  CHAR 42                                  */

/***
   ON ERROR SNAP PUT FILE(SYSPRINT) DATA
       (CHAR,VALUE,TOTAL,COP,ITEMS,ITEMS_OFFSET,I,J);
***/

   DO I = 0 TO CHAR-1;
         COP = COP + TABLE_SEGMENTS(I,2)*2;    /* CALC CUM OFFSET PTR */
         END;
   SEG_PTR = ADDR(TABLE_SEGMENTS(CHAR,1));
   DO I = 1 TO SEGMENTS;
         ITEM_PTR = ADDR(ITEMS_AND_OFFSET(COP));
         BOUNDS_PTR = ADDR(BOUNDS(WHICH_TABLE,1));
         DO J = 0 TO ITEMS-1;
               GET STRING(POP_REC) EDIT(VALUE)
                     (X((TABLE_OFFSET+ITEMS_OFFSET+J)*8),P'(8)9');
               IF VALUE < 0 THEN RETURN(0); /* SUPPRESSION CHECK */
               TOTAL = TOTAL + VALUE;
               END;
```

CENSLIST SOURCE LISTING

```
        COP = COP + 2;
        END;
   RETURN(TOTAL);
END TALLY;

EXIT: END SEARCH_4BP;
END CENSUS_LIST;
```

HOUSLIST SOURCE LISTING

```
/***
(SUBSCRIPTRANGE,STRINGRANGE,SIZE):
***/
HOUSING_LIST: PROC(PROGRAM_PARMS) OPTIONS(MAIN) REORDER;
DECLARE (MAX_CCDS INIT(50), MAX_KEYS INIT(100), MAX_CHARS INIT(68))
                                                    FIXED BIN(15),
        PROGRAM_PARMS CHAR(100) VARYING,
        ((AGGREGATING, SEARCHING) BIT(1),
        VALID_TYPES(6) PIC'99' INIT(1,2,7,8,9,10),
        (TABLE_ARRAY(200),I,J,K,L,TABLE_NUMBER) FIXED BIN(15),
        ONEB BIT(1) INIT('1'B),
        ((TABLE, AGGREGATE)(15,24) INIT((360)0),
        CATEGORY,BASE,PERCENT) FLOAT) STATIC,
        REC CHAR(11420) BASED(RECORD_POINTER),
        TEXT CHAR(3000) BASED(HEADER_POINTER),
        HEADER_KEY PIC'999',
        (ISAM4BH, HEADINGS, CHARHEAD) FILE RECORD SEQUENTIAL KEYED
                            ENVIRONMENT(INDEXED BUFFERS(1)),
        1 KEY_ARRAY(MAX_KEYS) CONTROLLED,
          2 KEY_COUNTY PIC'99',
          2 KEY_CCD PIC'999',
          2 KEY_TYPE PIC'99',
        1 COUNTY_CCD_TYPE BASED(CCT_PTR),
          2 COUNTY PIC'99',
          2 CCD PIC'999',
          2 TYPE PIC'99',
        (ADDR, ANY, CEIL, DATAFIELD, HBOUND, MIN, MOD,
         STRING, SUBSTR) BUILTIN ;
DECLARE COUNTY_NAME(67)              CHAR(10) VARYING INIT('AUTAUGA','BA
LDWIN','BARBOUR','BIBB','BLOUNT','BULLOCK','BUTLER','CALHOUN','CHAMBERS
','CHEROKEE','CHILTON','CHOCTAW','CLARKE','CLAY','CLEBURNE','COFFEE','C
OLBERT','CONECUH','COOSA','COVINGTON','CRENSHAW','CULLMAN','DALE','DALL
AS','DE KALB','ELMORE','ESCAMBIA','ETOWAH','FAYETTE','FRANKLIN','GENEVA
','GREENE','HALE','HENRY','HOUSTON','JACKSON','JEFFERSON','LAMAR','LAUD
ERDALE','LAWRENCE','LEE','LIMESTONE','LOWNDES','MACON','MADISON','MAREN
GO','MARION','MARSHALL','MOBILE','MONROE','MONTGOMERY','MORGAN','PERRY'
,'PICKENS','PIKE','RANDOLPH','RUSSELL','ST. CLAIR','SHELBY','SUMTER','T
ALLADEGA','TALLAPOOSA','TUSCALOOSA','WALKER','WASHINGTON','WILCOX','WIN
STON')  STATIC;

DECLARE 1 BOUNDS_OVLY BASED(BOUNDS_PTR),
          2 (ROWS,COLUMNS,TABLE_OFFSET) FIXED BIN(15),
        BOUNDS(200,3) FIXED BIN(15) INIT(1, 4,   0,  1, 4,     4,
              1, 4,      8,  1, 4,     12,  1, 3,    16,  1, 2,     19,
              4, 1,     21,  6,12,     25,  9,12,    97,  7, 9,    205,
              8,12,    268,  8,12,    364,  8,12,   460,  3, 6,    556,
              3, 6,    574,  6,10,    592,  4, 5,   652,  4, 6,    672,
             15, 3,    696, 10, 2,    741,  3, 3,   761,  4, 6,    770,
              2, 6,    794,  8, 5,    806,  8, 5,   846,  8, 5,    886,
```

HOUSLIST SOURCE LISTING

```
       6,12,    926,  3, 5,   998,  3, 5,  1013,  2, 5,  1028,
       2, 5,   1038,  5, 5,  1048,  2, 5,  1073,  2, 5,  1083,
       6, 1,   1093,  4, 1,  1099, 10, 9,  1103, 14, 5,  1193,
       5, 5,   1263,  6, 5,  1288,  2, 5,     0,  6, 9,    10,
       3, 6,     64,  4, 6,    82,  3, 6,   106,  3, 6,   124,
       3, 6,    142, 10,12,   160,  3, 2,   280,  7, 4,   286,
       2, 5,    314, 11, 4,   324, 11, 4,   368, 15, 4,   412,
      15, 4,    472,  3,12,   532,  6, 3,   568,  5, 1,   586,
       3,12,    591,  6, 9,   627,  1, 1,   681,  1, 1,   682,
       1, 1,    683,  1, 1,   684,  1, 1,   685,  2, 1,   686,
       1, 2,    688,  3, 4,   690,  9, 2,   702,  3, 4,   720,
       3, 4,    732,  3, 4,   744,  3, 2,   756,  4, 2,   762,
       3, 4,    770,  1, 2,   782, 11, 2,   784, 14, 4,   806,
      11, 4,    862,  5, 1,   906,  6, 1,   911,  4, 2,   917,
       8, 2,    925,  6, 4,   941,  9, 4,   965,  3, 4,  1001,
       6, 2,   1013,  7, 2,  1025,  3, 2,  1039,  3, 4,  1045,
       6, 4,   1057,  4, 2,  1081,  1, 4,  1089,  4, 4,  1093,
       2, 4,   1109,  8, 1,  1117,  8, 2,  1125,  8, 2,  1141,
       6, 4,   1157,  3, 1,  1181,  3, 2,  1184,  2, 2,  1190,
       2, 1,   1194,  3, 2,  1196,  2, 1,  1202,  2, 1,  1204,
       2, 1,   1206,  6,24,     0,  6,24,   144,  8,24,   288,
       3, 6,    480,  6,12,   498,  6,24,   570,  3, 6,   714,
       6,12,    732,  6,24,   804,  8,24,   948,  7,14,  1140,
       7,14,   1238,  6,14,     0,  5,14,    84,  5,16,   154,
       2,16,    234,  5,16,   266,  6,16,   346,  6,16,   442,
       8,16,    538,  7,16,   666,  7,16,   778,  5,16,   890,
       8,18,      0,  8, 3,   144,  8,10,   168,  2, 3,   248,
       2,12,    254,  6, 3,   278,  6,12,   296,  6, 3,   368,
       6,12,    386,  4, 3,   458,  4,12,   470,  8, 8,   518,
       5, 4,    582,  5, 6,   602,  4, 7,   632,  4, 7,   660,
       5, 7,    688,  4, 7,   723,  5, 7,   751,  4, 7,   786,
       5, 7,    814,  9, 1,   849,  6, 6,     0,  6, 6,    36,
       8, 6,     72,  6, 6,   120,  6, 6,   156,  6, 6,   192,
       6, 6,    228,  8, 6,   264,  7, 7,   312,  7, 7,   361,
       6, 7,    410,  5, 7,   452,  5, 8,   487,  2, 8,   527,
       5, 8,    543,  6, 8,   583,  6, 8,   631,  8, 8,   679,
       7, 8,    743,  7, 8,   799,  5, 8,   855,  8, 9,   895,
       8, 5,    967,  2, 6,  1007,  6, 6,  1019,  6, 6,  1055,
       4, 6,   1091,  8, 2,  1115,  5, 2,  1131,  3, 1,  1141,
       6, 5,   1144,  6, 5,  1174,  6, 6,  1204,  6, 6,  1240,
       6, 7,   1276,  6, 2,  1318,  6, 2,  1330,  7, 2,  1342,
       7, 2,   1356,  6, 2,  1370,  7, 2,  1382,  2, 3,  1396,
       3, 1,   1402,  3, 1,  1405,  3, 1,  1408,  3, 1,  1411,
       3, 2,   1414,  3, 2,  1420) STATIC;

/***
 ON ERROR SNAP BEGIN; ON ERROR SYSTEM; PUT FILE(SYSPRINT) DATA
             (KEY_ARRAY(L),K);
             PUT FILE(SYSPRINT) LIST(ROWS,COLUMNS,TABLE_NUMBER,
                                SUBSTR(TEXT,1,400),SUBSTR(REC,1,100));
```

HOUSLIST SOURCE LISTING

```
             END;
***/

   GET STRING(PROGRAM_PARMS||';') DATA(MAX_CCDS,MAX_KEYS);
   ALLOCATE KEY_ARRAY;
   OPEN FILE(SYSPRINT) LINESIZE(132);

DO WHILE(ONEB);
CALL READ_PARM_SET;
IF SEARCHING THEN CALL SEARCH_4BH;
ELSE
   IF AGGREGATING
      THEN DO K = 1 TO HBOUND(TABLE_ARRAY,1) WHILE(TABLE_ARRAY(K)¬=0);
              AGGREGATE = 0;
              TABLE_NUMBER = TABLE_ARRAY(K);
              DO L = 1 TO MAX_KEYS WHILE(KEY_CCD(L) ¬= '00');
                 CCT_PTR = ADDR(KEY_ARRAY(L));
                 IF RECORD_EXISTS THEN AGGREGATE = AGGREGATE + TABLE;
                 END;
              CALL OUTPUT_TABLE(AGGREGATE);
              END;

      ELSE DO L = 1 TO MAX_KEYS WHILE(KEY_CCD(L) ¬= '00');
              CCT_PTR = ADDR(KEY_ARRAY(L));
              DO K = 1 TO HBOUND(TABLE_ARRAY,1)
                                             WHILE(TABLE_ARRAY(K) ¬= 0);
                 TABLE_NUMBER = TABLE_ARRAY(K);
                 IF RECORD_EXISTS THEN CALL OUTPUT_TABLE(TABLE);
                 END;
              END;
END;

RECORD_EXISTS: PROC RETURNS(BIT(1));
DECLARE LAST_REC CHAR(7) STATIC;

    ON KEY(ISAM4BH) BEGIN; PUT FILE(SYSPRINT) EDIT
        ('*RECORD TYPE SPECIFIED DOES NOT EXIST FOR THIS CCD, OR CCD SP
ECIFIED DOES NOT EXIST IN COUNTY SPECIFIED') (COL(1),A);
        IF AGGREGATING THEN PUT FILE(SYSPRINT) EDIT
              ('*COUNTY-CCD-RECORD_TYPE ',COUNTY,'-',CCD,'-',
           TYPE,' OMMITTED FROM THIS AGGREGATION')(COL(1),(7)(A));
                    ELSE PUT FILE(SYSPRINT) EDIT
              ('*TABLE ',TABLE_NUMBER,' HAS BEEN OMITTED FOR COUNTY-CC
D-RECORD_TYPE ',COUNTY,'-',CCD,'-',TYPE)
                                          (COL(1),A,F(3),(6)(A));
        GO TO RECORD_DOESNT_EXIST;
        END;

    ON CONDITION(SUPPRESSION) BEGIN;
        PUT FILE(SYSPRINT) EDIT
```

HOUSLIST SOURCE LISTING

```
          ('*COUNTY-CCD-RECORD_TYPE ',COUNTY,'-',CCD,'-',
             TYPE,' OF THIS AGGREGATION CONTAINS SUPPRESSED DATA')
           (COL(1),(7)(A));
     END;

  ON CONDITION(IGNORE) BEGIN; PUT FILE(SYSPRINT) EDIT
     ('*TABLE ',TABLE_NUMBER,' DOES NOT EXIST FOR RECORD_TYPE ',
        TYPE,' IN COUNTY-CCD ',COUNTY,'-',CCD,'.  IGNORED.')
                              (COL(1),A,F(3),(7)(A));
     GO TO RECORD_DOESNT_EXIST;
     END;


  /* THIS IS MOSTLY TO KEEP AGGREGATIONS */
  /* FROM GOING ACROSS RECORD_TYPES.     */
  IF TYPE¬=FIND_TYPE(TABLE_NUMBER) THEN SIGNAL CONDITION(IGNORE);

  IF LAST_REC ¬= STRING(COUNTY_CCD_TYPE)
    THEN DO; READ FILE(ISAM4BH) KEY(STRING(COUNTY_CCD_TYPE))
                                                SET(RECORD_POINTER);
             LAST_REC = STRING(COUNTY_CCD_TYPE);
             END;
  BOUNDS_PTR = ADDR(BOUNDS(TABLE_NUMBER,1));
  TABLE = 0;
  GET STRING(REC) EDIT
          (((TABLE(I,J) DO I = 1 TO ROWS) DO J = 1 TO COLUMNS))
          (X(TABLE_OFFSET*8),(ROWS*COLUMNS)(F(8)));
 /* IS THIS THE BEST ANSWER? */
  IF AGGREGATING THEN IF ANY(TABLE < 0)
                          THEN SIGNAL CONDITION(SUPPRESSION);
  RETURN('1'B);

RECORD_DOESNT_EXIST:  RETURN('0'B);
END RECORD_EXISTS;

READ_PARM_SET:  PROC;
DECLARE INPUT FILE STREAM,
        (((COUNTY,CCD,RECORD_TYPE,TABLES) CHAR(320),
/*      IDEALLY THE ABOVE SHOULD BE APPROX 3*MAX_KEYS                  */
        LEVEL CHAR(5), CHARACTERISTIC CHAR(8) ) STATIC,
        (AGGREGATE, SEARCH) CHAR(3) ) VARYING,
        END PIC'9999',
        COMMAS CHAR(400) INIT((200)',0');
/*      THE ABOVE SHOULD BE CLOSE TO 2*MAX_KEYS                        */

   ON ENDFILE(INPUT) BEGIN;
 IF ¬SEARCHING THEN DO; READ FILE(HEADINGS) KEY('201')
                                      SET(HEADER_POINTER);
                    GET STRING(TEXT) EDIT(END) (X(4),P'9999');
                    PUT SKIP(2) FILE(SYSPRINT) EDIT('FOOTNOTES',
```

HOUSLIST SOURCE LISTING

```
                    (SUBSTR(TEXT,I,132) DO I = 9 BY 132
                                                  WHILE(I<END)))
                    (COL(62),A,(50)(COL(1),A(132)));
                    END;
                  STOP;
                  END;

   ON NAME(INPUT) BEGIN; PUT FILE(SYSPRINT) EDIT
        ('*UNRECOGNIZABLE INPUT - ',DATAFIELD,' - FOUND IN REQUEST SET.
 CHECK YOUR SPELLING AND PUNCTUATION.  REQUEST SET IGNORED.')((3)(A));
        GO TO RECOVER;
        END;

   ON CONDITION(BAD_DATA) BEGIN;
        PUT FILE(SYSPRINT) EDIT('*UNREAL COUNTY, CCD, RECORD_TYPE, CHAR
ACTERISTIC, LEVEL, OR TABLE NUMBER FOUND.  REQUEST IGNORED.')
                                                          (COL(1),A);

        GO TO RECOVER;
        END;

RECOVER:
   GET FILE(INPUT) DATA(COUNTY,CCD,RECORD_TYPE,TABLES,AGGREGATE,SEARCH,
                              CHARACTERISTIC,LEVEL);
   IF AGGREGATE = 'YES' THEN AGGREGATING = 1B;
                            ELSE AGGREGATING = 0B;
   IF SEARCH = 'YES'
      THEN DO; SEARCHING = 1B;
               GET STRING(CHARACTERISTIC) LIST(CATEGORY, BASE);
               GET STRING(LEVEL) LIST(PERCENT);
               PERCENT = PERCENT * 1E-2;        /* SCALE */
               IF CATEGORY<=0|CATEGORY>MAX_CHARS|
                  BASE<=0|BASE>MAX_CHARS|
                  PERCENT<0|PERCENT>1
                  THEN SIGNAL CONDITION(BAD_DATA);
               END;
      ELSE DO; SEARCHING = 0B;
               GET STRING(COUNTY||COMMAS) LIST(KEY_COUNTY);
               GET STRING(CCD||COMMAS) LIST(KEY_CCD);
               GET STRING(RECORD_TYPE||COMMAS) LIST(KEY_TYPE);
               GET STRING(TABLES||COMMAS) LIST(TABLE_ARRAY);
               DO I = 1 TO MAX_KEYS WHILE(KEY_CCD(I) ¬= '00');
                  IF KEY_COUNTY(I) > '67' |
                     ¬ANY(KEY_TYPE(I) = VALID_TYPES)  |
                     MOD(KEY_CCD(I),5) ¬= 0
                     THEN SIGNAL CONDITION(BAD_DATA);
                  END;
                  IF ANY(TABLE_ARRAY > 200 | TABLE_ARRAY < 0)
                     THEN SIGNAL CONDITION(BAD_DATA);
               END;
 END READ_PARM_SET;
```

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```
FIND_TYPE: PROC(TN) RETURNS(PIC'99');
DECLARE (TN, LIMITS(6) INIT(40,107,119,130,152,200)) FIXED BINARY;

   DO I = 1 TO 6 WHILE(TN > LIMITS(I)); END;
   RETURN(VALID_TYPES(I));
END FIND_TYPE;

OUTPUT_TABLE: PROC(ANY_TABLE);
DECLARE (LINE(100),LEFT,LEN,PIECES,C_WIDE,I,J,K,L,U) FIXED BIN(15),
        S_TABLE(26,2) FIXED BIN(15) INIT(108, 6, 109, 6, 110, 6,
        112, 6, 113, 6, 115, 6, 116, 6,
                                117, 6, 118, 7, 119, 7, 120, 7, 121, 7,
        122, 8, 123, 8, 124, 8, 125, 8, 126, 8, 127, 8, 128, 8,
        129, 8, 130, 8, 133, 5, 135, 6, 137, 6, 139, 6, 141, 6),
        ANY_TABLE(*,*) FLOAT,
        TYPE_NAME(10) CHAR(27) VARYING INIT((2)(1)'TOTAL POPULATION',
             (4)(0)'',(3)(1)'TOTAL POPULATION',
             'SPANISH-AMERICAN POPULATION');

                /* MAX COLUMNS PER ROW IS NINE */
   C_WIDE = MIN(COLUMNS,9);
                /* SEE IF THE DIMENSIONS OF THE TABLE CHANGE FOR OUTPUT*/
   DO I = 1 TO HBOUND(S_TABLE,1);
        IF TABLE_NUMBER=S_TABLE(I,1) THEN C_WIDE = S_TABLE(I,2);
        END;
                /* FIND THE NUMBER OF DIFFERENT PIECES                  */
                /* (IN ROWS X C_WIDE BLOCKS) THAT WILL BE OUTPUT        */
   PIECES = CEIL(COLUMNS/C_WIDE);
                /* GRAB THE HEADING RECORD */
   HEADER_KEY = TABLE_NUMBER;
   READ FILE(HEADINGS) KEY(HEADER_KEY) SET(HEADER_POINTER);
   GET STRING(TEXT) EDIT((LINE(I) DO I=1 TO ROWS+PIECES+1)) (F(4));

   IF AGGREGATING THEN PUT SKIP(3) FILE(SYSPRINT) EDIT
        ('TABLE ',TABLE_NUMBER,' AS AN AGGREGATE OF THESE COUNTY-CCD-RE
CORD_TYPES',
        (COUNTY_NAME(KEY_COUNTY(I)),'-',KEY_CCD(I),'-',
          TYPE_NAME(KEY_TYPE(I))
              DO I = 1 TO MAX_CCDS WHILE(KEY_CCD(I) ¬= 0)))
     (COL(1),A,F(3),A,(MAX_CCDS)(COL(MOD(I-1,4)*33+1),A,A,P'ZZ9',A,A));

                    ELSE PUT SKIP(3) FILE(SYSPRINT) EDIT
                         ('TABLE ',TABLE_NUMBER,COUNTY_NAME(COUNTY),
                         ' COUNTY, CENSUS DIVISION ',CCD,', ',
                         TYPE_NAME(TYPE))
                              (COLUMN(1),A,F(3),X(2),A,A,P'ZZ9',A,A);

   DO K = 1 TO PIECES;
        LEN = LINE(ROWS+K+1) - LINE(ROWS+K);
```

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          /* FOR EACH PIECE OF THE TABLE,                                    */
          /*                     WRITE THE COLUMN HEADINGS                   */
      PUT FILE(SYSPRINT) EDIT(SUBSTR(TEXT,LINE(ROWS+K),LEN))
                             (COL(1),A);
          /* FIGURE OUT WHICH COLUMMS OF THIS ROW TO OUTPUT                  */
      L = (K-1)*C_WIDE + 1;
      U = MIN(K*C_WIDE,COLUMNS);
      LEFT = 131 - (U-L+1) * 11;
      DO I = 1 TO ROWS;
          LEN = LINE(I+1) - LINE(I);
          PUT FILE(SYSPRINT) EDIT((ANY_TABLE(I,J) DO J=L TO U),
                                          SUBSTR(TEXT,LINE(I),LEN))
                             (COL(2),(U-L+1 )(F(8),X(3)),A(LEFT));
          /* FOR THE ROW HEADING THAT WON'T FIT ON ONE LINE */
          IF LEN>LEFT THEN PUT FILE(SYSPRINT) EDIT
               (SUBSTR(TEXT,LINE(I)+LEFT,LEN-LEFT))
                             (COL((U-L+1)*(8+3)+2),A);
          END;
      END;
END OUTPUT_TABLE;

SEARCH_4BH: PROC;
DECLARE (COUNTY, CAT_TYPE, BASE_TYPE) PIC'99',
        CCD PIC '999',
        (HOLD, COMPUTED_LEVEL) FLOAT,
        FOUND FIXED BINARY INIT(0),
        CHAR_HEADER CHAR(80) VARYING,
        1 SEG_OVLY BASED(SEG_PTR),
          2 (WHICH_TABLE, SEGMENTS) FIXED BIN(15),
/*  IMPORTANT - THE ORDER OF ITEMS IN THIS ARRAY MUST BE CONSISTENT  */
/*  WITH THE ORDER OF ITEMS IN ITEMS_AND_OFFSET;  THE ROW NUMBER     */
/*  CORRESPONDS TO THE CHARACTERISTIC NUMBERS THAT ARE INPUT.        */
/*  NEW CHARACTERISTICS SHOULD BE EASY TO ADD TO THE END.            */
        TABLE_SEGMENTS(0:MAX_CHARS,2) FIXED BIN(15) INIT(
          0,   0,     /* DUMMY   */    8,  1,   /* ITEM 1  */
          8,   1,     /* ITEM 2  */    8,  1,   /* ITEM 3  */
          8,   1,     /* ITEM 4  */    8,  1,   /* ITEM 5  */
          8,   1,     /* ITEM 6  */    8,  2,   /* ITEM 7  */
          8,   1,     /* ITEM 8  */    8,  2,   /* ITEM 9  */
          8,   1,     /* ITEM 10 */    9,  2,   /* ITEM 11 */
          9,   1,     /* ITEM 12 */   14,  1,   /* ITEM 13 */
         14,   1,     /* ITEM 14 */   15,  1,   /* ITEM 15 */
         15,   1,     /* ITEM 16 */   17,  1,   /* ITEM 17 */
         18,   1,     /* ITEM 18 */   25,  1,   /* ITEM 19 */
         25,   1,     /* ITEM 20 */   25,  1,   /* ITEM 21 */
         27,   1,     /* ITEM 22 */   27,  1,   /* ITEM 23 */
         27,   1,     /* ITEM 24 */   27,  1,   /* ITEM 25 */
         27,   2,     /* ITEM 26 */   37,  1,   /* ITEM 27 */
         37,   1,     /* ITEM 28 */   37,  1,   /* ITEM 29 */
         37,   1,     /* ITEM 30 */   37,  1,   /* ITEM 31 */
```

```
         38,    1,       /* ITEM 32 */     38,   2,    /* ITEM 33 */
         42,    1,       /* ITEM 34 */     42,   1,    /* ITEM 35 */
         42,    1,       /* ITEM 36 */     52,   1,    /* ITEM 37 */
         52,    1,       /* ITEM 38 */     52,   1,    /* ITEM 39 */
         52,    1,       /* ITEM 40 */    123,   1,    /* ITEM 41 */
        123,    1,       /* ITEM 42 */    123,   1,    /* ITEM 43 */
        123,    1,       /* ITEM 44 */     59,   1,    /* ITEM 45 */
         59,    1,       /* ITEM 46 */ [illegible],   1,    /* ITEM 47 */
         59,    1,       /* ITEM 48 */     60,   1,    /* ITEM 49 */
         60,    1,       /* ITEM 50 */    118,   1,    /* ITEM 51 */
        118,    1,       /* ITEM 52 */    118,   2,    /* ITEM 53 */
        118,    2,       /* ITEM 54 */    128,   1,    /* ITEM 55 */
        128,    1,       /* ITEM 56 */    128,   3,    /* ITEM 57 */
        128,    3,       /* ITEM 58 */    142,   1,    /* ITEM 59 */
        142,    1,       /* ITEM 60 */      8,   1,    /* BASE 1  */
          8,    1,       /* BASE 2  */      8,   1,    /* BASE 3  */
          8,    1,       /* BASE 4  */      8,   1,    /* BASE 5  */
          8,    1,       /* BASE 6  */      8,   1,    /* BASE 7  */
          8,    1);      /* BASE 8  */
DECLARE HIGHEST_CCD(67) FIXED BINARY INIT( 20,  45,  25,  20,  35,  20,
        25,  45,  30,  20,  30,  20,  30,  15,  15,  40,  25,  25,  15,
        40,  20,  55,  25,  35,  50,  30,  25,  50,  20,  20,  25,  20,
        35,  25,  40,  40, 135,  15,  40,  35,  35,  40,  25,  30,  45,
        30,  35,  40,  60,  30,  45,  40,  25,  30,  30,  25,  25,  25,
        40,  30,  50,  30,  65,  70,  25,  25,  20);

/***
   ON ERROR SNAP PUT FILE(SYSPRINT) DATA
        (CATEGORY,CAT_TYPE,BASE,BASE_TYPE,HOLD,COMPUTED_LEVEL,
         PERCENT,COUNTY,CCD,WHICH_TABLE,SEGMENTS);
***/

   ON KEY(ISAM4BH) GO TO NEXT_CCD;   /* IGNORE INTERRUPUTS,  */
                                     /* SINCE WE BUILD THE KEYS */

   HEADER_KEY = CATEGORY;
   READ FILE(CHARHEAD) INTO(CHAR_HEADER) KEY(HEADER_KEY);
   PUT SKIP(2) FILE(SYSPRINT) EDIT('SEARCH FOR CCD''S IN WHICH ',
        CHAR_HEADER,' AS A PERCENT OF ') (COL(1),(3)(A));
   HEADER_KEY = BASE;
   READ FILE(CHARHEAD) INTO(CHAR_HEADER) KEY(HEADER_KEY);
   PUT FILE(SYSPRINT) EDIT(CHAR_HEADER,' EXCEED ',PERCENT,'%',
        ('COUNTY        CCD' DO I = 1 TO 5))
                                (A,A,F(5,1,2),A,COL(1),(5)(A,X(9)));

   CAT_TYPE = FIND_TYPE(TABLE_SEGMENTS(CATEGORY,1));
   BASE_TYPE = FIND_TYPE(TABLE_SEGMENTS(BASE,1));
   DO COUNTY = 1 TO 67;
      DO CCD = 5 BY 5 TO HIGHEST_CCD(COUNTY);
         READ FILE(ISAM4BH) KEY(COUNTY||CCD||BASE_TYPE)
                                          SET(RECORD_POINTER);
```

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```
         HOLD = TALLY(BASE);
         IF CAT_TYPE ¬= BASE_TYPE
            THEN READ FILE(ISAM4BH) KEY(COUNTY||CCD||CAT_TYPE)
                                                 SET(RECORD_POINTER);
         IF HOLD = 0 THEN COMPUTED_LEVEL = 0;
                     ELSE COMPUTED_LEVEL = TALLY(CATEGORY) / HOLD;
         IF COMPUTED_LEVEL >= PERCENT
            THEN DO; FOUND = FOUND + 1;
                     PUT FILE(SYSPRINT) EDIT(COUNTY_NAME(COUNTY),CCD,
                                                  COMPUTED_LEVEL,'%')
                     (COL(MOD(FOUND-1,5)*24+1),A(10),X(2),P'ZZ9',X(2),
                                                        F(5,1,2),A);
                     IF FOUND >= MAX_CCDS THEN GO TO EXIT;
                     END;
         NEXT_CCD:
          END;
      END;
   IF FOUND = 0 THEN PUT FILE(SYSPRINT) EDIT
        ('*NO COUNTY-CCD''S MEET THE SPECIFIED LEVEL')(COL(1),A);

TALLY: PROC(CHAR) RETURNS(FLOAT);
DECLARE (CHAR, VALUE, TOTAL INIT(0)) FLOAT,
        COP FIXED BIN(15) INIT(1),
        1 ITEMS_OVLY BASED(ITEM_PTR),
          2 (ITEMS, ITEMS_OFFSET) FIXED BIN(15),
        ITEMS_AND_OFFSET(MAX_CHARS*3) FIXED BIN(15) INIT(
    6,     12,                                         /* ITEM    1  */
    6,     13,                                         /* ITEM    2  */
    6,     24,                                         /* ITEM    3  */
    6,     66,                                         /* ITEM    4  */
    6,     60,                                         /* ITEM    5  */
    1,     11,                                         /* ITEM    6  */
    1,     65,     1,     71,                          /* ITEM    7  */
    3,      6,                                         /* ITEM    8  */
    3,     60,     3,     66,                          /* ITEM    9  */
    1,      9,                                         /* ITEM   10  */
    1,     90,     1,     99,                          /* ITEM   11  */
    1,     17,                                         /* ITEM   12  */
    1,      3,                                         /* ITEM   13  */
    1,      4,                                         /* ITEM   14  */
    1,      3,                                         /* ITEM   15  */
    1,      4,                                         /* ITEM   16  */
    1,      0,                                         /* ITEM   17  */
    3,      4,                                         /* ITEM   18  */
    1,      0,                                         /* ITEM   19  */
    1,      1,                                         /* ITEM   20  */
    1,      2,                                         /* ITEM   21  */
    2,     12,                                         /* ITEM   22  */
    2,     30,                                         /* ITEM   23  */
```

```
 2,     36,                                                /* ITEM   25 */
 2,     60,     2,     66,                                 /* ITEM   26 */
 1,      0,                                                /* ITEM   27 */
 2,      4,                                                /* ITEM   28 */
 5,     30,                                                /* ITEM   29 */
 2,      7,                                                /* ITEM   30 */
 2,     37,                                                /* ITEM   31 */
 1,      5,                                                /* ITEM   32 */
 1,     11,     1,     13,                                 /* ITEM   33 */
 2,     10,                                                /* ITEM   34 */
 2,     15,                                                /* ITEM   35 */
 2,     22,                                                /* ITEM   36 */
 1,      0,                                                /* ITEM   37 */
 1,     11,                                                /* ITEM   38 */
 2,      0,                                                /* ITEM   39 */
 2,     11,                                                /* ITEM   40 */
 2,      0,                                                /* ITEM   41 */
 2,     16,                                                /* ITEM   42 */
 5,      0,                                                /* ITEM   43 */
 5,     16,                                                /* ITEM   44 */
 1,      8,                                                /* ITEM   45 */
 1,     17,                                                /* ITEM   46 */
 1,     11,                                                /* ITEM   47 */
 1,     20,                                                /* ITEM   48 */
 1,      5,                                                /* ITEM   49 */
 1,     23,                                                /* ITEM   50 */
 1,      0,                                                /* ITEM   51 */
 1,     49,                                                /* ITEM   52 */
 1,      0,     1,      7,                                 /* ITEM   53 */
 1,     49,     1,     56,                                 /* ITEM   54 */
 2,      4,                                                /* ITEM   55 */
 2,     60,                                                /* ITEM   56 */
 2,      4,     2,     11,     2,     18,                  /* ITEM   57 */
 2,     60,     2,     67,     2,     74,                  /* ITEM   58 */
 2,      8,                                                /* ITEM   59 */
 2,     56,                                                /* ITEM   60 */
 6,      6,                                                /* BASE   1  */
 5,      0,                                                /* BASE   2  */
12,     60,                                                /* BASE   3  */
 6,     12,                                                /* BASE   4  */
 6,     30,                                                /* BASE   5  */
 5,     18,                                                /* BASE   6  */
 6,     36,                                                /* BASE   7  */
 5,     24);                                               /* BASE   8  */

/***
   ON ERROR SNAP PUT FILE(SYSPRINT) DATA
        (CHAR,VALUE,TOTAL,COP,ITEMS,ITEMS_OFFSET,I,J);
***/
```

HOUSLIST SOURCE LISTING

```
   DO I = 0 TO CHAR-1;
         COP = COP + TABLE_SEGMENTS(I,2)*2;    /* CALC CUM OFFSET PTR */
         END;
   SEG_PTR = ADDR(TABLE_SEGMENTS(CHAR,1));
   DO I = 1 TO SEGMENTS;
         ITEM_PTR = ADDR(ITEMS_AND_OFFSET(COP));
         BOUNDS_PTR = ADDR(BOUNDS(WHICH_TABLE,1));
         DO J = 0 TO ITEMS-1;
              GET STRING(REC) EDIT(VALUE)
                         (X((TABLE_OFFSET+ITEMS_OFFSET+J)*8),F(8));
              IF VALUE < 0 THEN RETURN(0);   /*  SUPPRESSION CHECK   */
              TOTAL = TOTAL + VALUE;
              END;
         COP = COP + 2;
         END;
   RETURN(TOTAL);
END TALLY:
EXIT:
END SEARCH_4BH;

END HOUSING_LIST;
```

APPENDIX C

ABSTRACT AND PROGRAM DESCRIPTION

THIS FORM MUST BE COMPLETED BY TYPEWRITER

01/4	01/7 SYSTEM OR PROGRAM NO.		01/14 DATE
MSF		**COMPUTER PROGRAM ABSTRACT**	

01/80 TITLE OF SYSTEM OR PROGRAM (61 CHARACTERS MAXIMUM)	PARENT PROGRAM 02/14 CATEGORY	02/15 SITE	02/16 PROGRAM NO.
AU CENSLIST AND HOUSLIST PROGRAMS			

02/26 CATEGORY	02/27 LANGUAGE NO. 1	02/32 LANGUAGE NO. 2	02/37 KEY WORDS (8 MAXIMUM, SEPARATED BY COMMAS)
	PLI		Census Data, Informational Retrieval

ORIGINATOR

03/14 CONTACT	03/26 SITE	03/31 ORGN CODE	03/39 PROJECT NO.	03/46 NASA CENTER	03/48 STATUS	03/49
					☐ A. UNDER DEVELOPMENT ☐ B. OPERATIONAL ☐ C. COMPLETED	☐ THIS PROGRAM IS NOT FOR SHARING

DATES 03/50 INITIATED	03/54 COMPLETED	03/58 REVISION CODE	03/59 MANMONTHS	03/64 MACHINE HOURS	03/69 COMPUTER TYPE	03/74 TOTAL COST (DOLLARS)
		☐ A. REVISION ☐ B. CANCELLATION				

CARD NUMBER | COLUMN 14 | ABSTRACT | ELITE MARGIN | PICA MARGIN

06 These two programs operate on a subset of the 1970 Bureau of the
07 Census data for Alabama. They build and/or aggregate tables for
08 census divisions and can search for CCD's which meet certain
09 specifications.

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PROGRAM DESCRIPTION

(1) Hardware

(a) Computer - IBM 370/158

(b) Core Requirement - 128K

(c) Magnetic Tapes - None

(d) Card Punch - Not required

(e) Plotter - Not required

(f) Drum/Disk - 100 cylinders of disk space required
IBM 3330 Model 1

(2) Software

(a) Operating System - OS/360 Release 21.8, MVT & HASP II

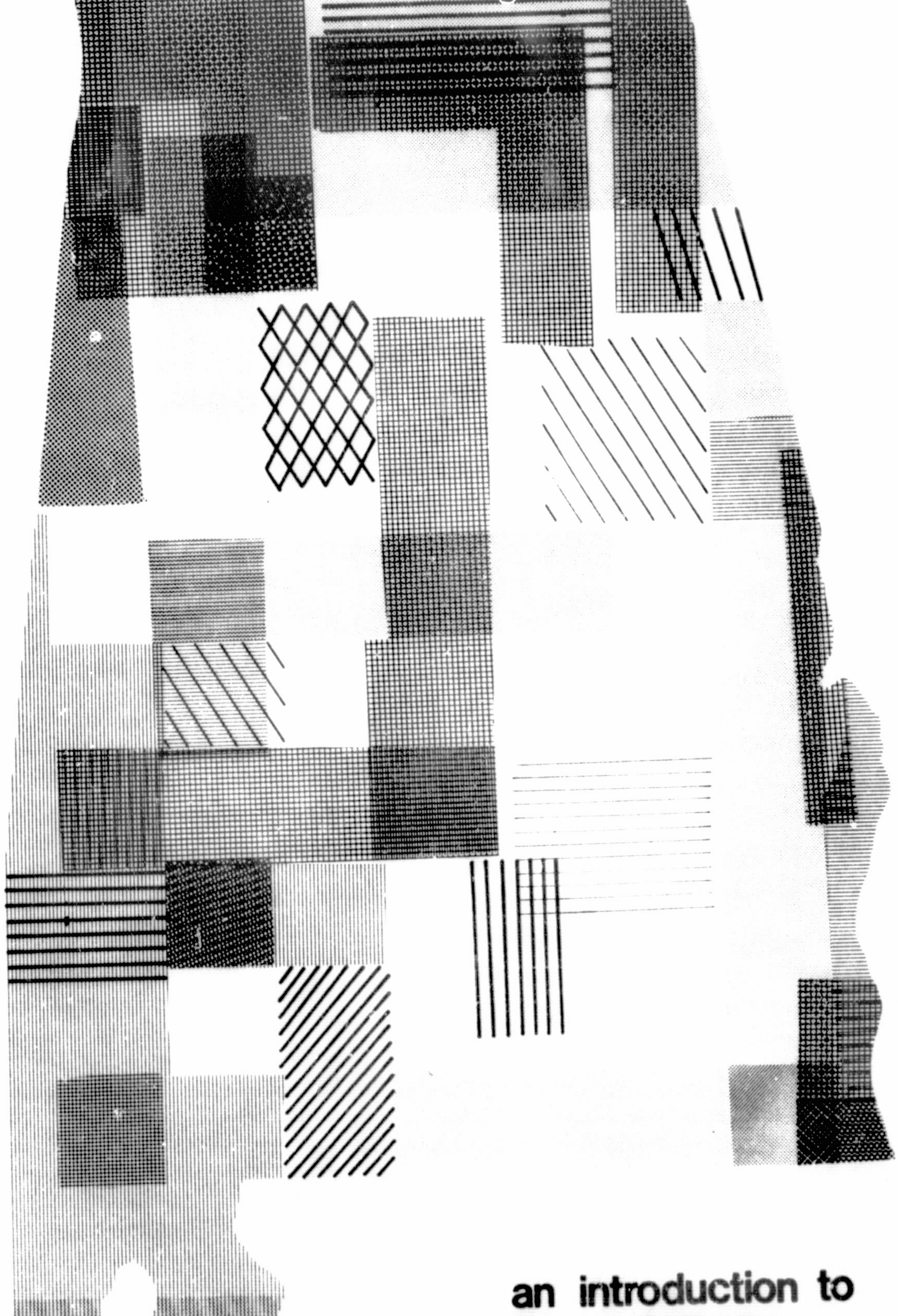
(b) Programming Lanuage - PL/I Optimizing Compiler VIR2.3 PTF61

(c) Type of Run - Batch

(d) Library Subroutines - Standard Optimizing Compiler
Subroutine Package

APPENDIX D

ARIS PUBLICATIONS



an introduction to

ARIS

ALABAMA RESOURCES INFORMATION SYSTEM

an introduction to

ARIS

ALABAMA RESOURCES INFORMATION SYSTEM

developed by

Auburn University

under contract with

National Aeronautics & Space Administration
Contract NAS8-30654

Alabama Development Office
ALA-AU-X996-1060-5

"The preparation of this booklet was financed in part through a Comprehensive Planning Grant from the Department of Housing and Urban Development, HUD P-1060; administered by the State Planning Division, Alabama Development Office; Office of the Governor."

PREFACE

In the short history of automated geographic analysis and computer mapping, there have been a number of programming efforts which have been directed toward analysis and display of spatial data with a computer system. ARiS is a more user-oriented adaptation of the best available marketed software. The advantages of graphics produced by the computer over the products of hand cartography fall into three main categories:

1. Increased manipulation capabilities of geographic data.

2. Faster production of cartographic displays.

3. Realization of a reduced cost per unit of information provided.

Cartographic analyses and displays that will most likely benefit from the use of computers have one or more of the following characteristics:

1. Many maps or analysis outputs for the same geographic area are needed at one time.

2. Maps or analysis for the same geographic area are needed on a recurring basis over a period of time.

3. Uniformity of a map and printout appearance for the display of many types of data is desired.

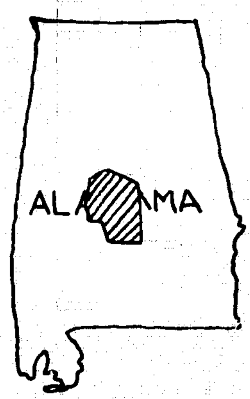
4. Utilization of highly accurate data is desired, without the necessity of high cartographic resolution on maps.

5. A great number of maps need to be prepared in a short period of time.

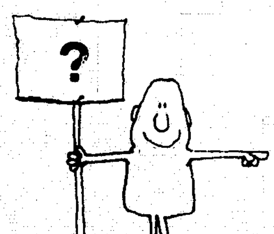
6. Complex geographic analysis is required, involving the rescaling of data from a single map or a combination of several data variables for a common geographic area.

This booklet is intended to introduce the content of ARIS as it is presently structured, to indicate the planned evaluation of its capability, and to illustrate the method of interaction with the system by planners and others having a need to make decisions based on geographic alternatives.

The basic ARIS software is operational on a large scale IBM System 370 computer. All geographic and cartographic programs are written in the FORTRAN IV language, thus permitting a certain level of system portability to other large computer installations. Software dealing with census-based population and housing data tabulations and searches has been written in the PL/1 language to permit use of the high speed information processing available with the indexed-sequential access method (ISAM) of structuring data files. This software and data structuring scheme is less portable.



CONTENTS



INQUIRIES RELATIVE TO ARIS SHOULD BE DIRECTED TO THE ALABAMA DEVELOPMENT OFFICE, STATE PLANNING DIVISION MONTGOMERY, ALABAMA

Spatial information systems concepts:

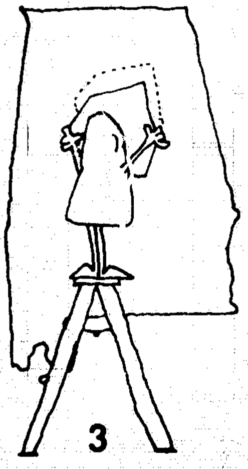
GEOGRAPHIC DATA BASE CONCEPT

The primary method in ARIS for acquisition, storage, and utilization of geographic data is through the use of regularly-sized units of area, called grid cells. Important to the way the software functions, is the structure of the data base; the method of data storage for software retrieval and utilization. Areal information, or variables, to be stored, such as topography or soil type, are geographically oriented, while computer storage is sequentially oriented. A system, or scheme, must exist which relates these non-similar orientations. This is accomplished by the use of a locational reference in the data.

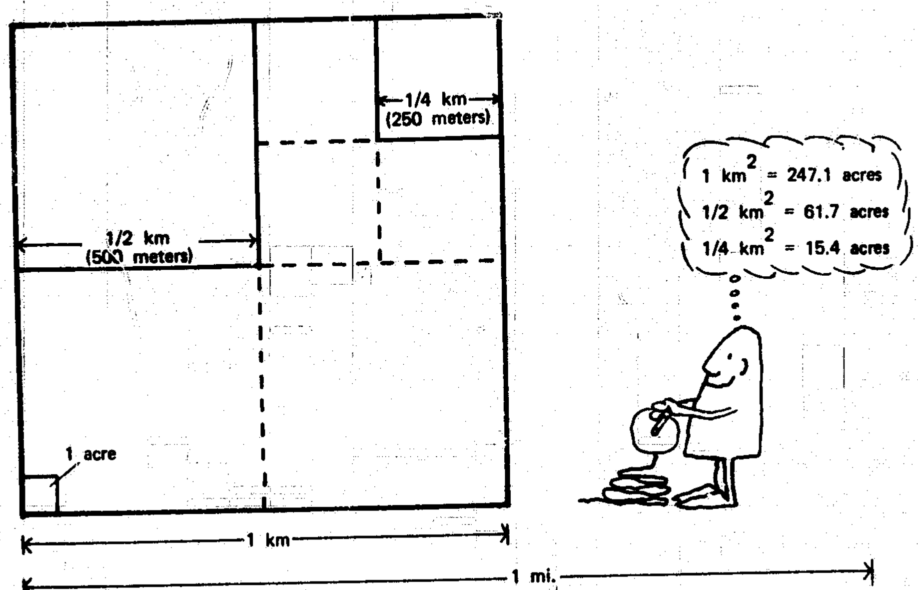
Suppose a large geographic area was subdivided into many small sub-areas. Each sub-area could then be more definitively described than the original area, because less variation would be likely to occur. A further reduction in the size of a sub-area would further increase the possibility of unique definition. At some point, say one acre, a specific data category, such as "soil type" within the overall variable "soil" could be identified as that soil type most representative of the soils within the acre. This soil type could be considered to be discretely representative of the variable soil within the smaller areal unit. If many of these areal units were placed side by side, both horizontally and vertically, with each representing a discrete soil type, a large area could be represented regarding the variability of soils. Similar capture of other geographic variables, such as slope, surface water, ground water, etc. (each separately), permits the complete geographic description of an area to be utilized by computer software. This system of contiguous areal units to represent a variable, such as soils, slope, or surface water, is the design basis for the ARIS geographic data system.

Since the earth has a generally rounded surface and since most cartographic representations of its surface are flat, another mismatch exists. Projections of surface features, boundaries, and their locations to a flat surface receive distortion from the true situation. The Universal Transverse Mercator (UTM) system for locating geographical attributes minimizes projection distortion with respect to the State of Alabama - Alabama is nearly in the center of UTM zone sixteen. For this reason, grid cells based on the UTM system have been chosen for use within ARIS. It is expected that each data base relating to the entire State or used for state-wide analysis will encompass an area of one-fourth of a square kilometer (one half of a kilometer on a side). At the same time, those data bases having regional importance are expected to encompass an area of one-sixteenth of a square kilometer (one quarter of a kilometer on a side). All grid cells are to be related to a single unique extreme northwest point on a UTM grid overlaying the entire State. This will permit all separate data bases to be interrelatable with minimal boundary conflict.

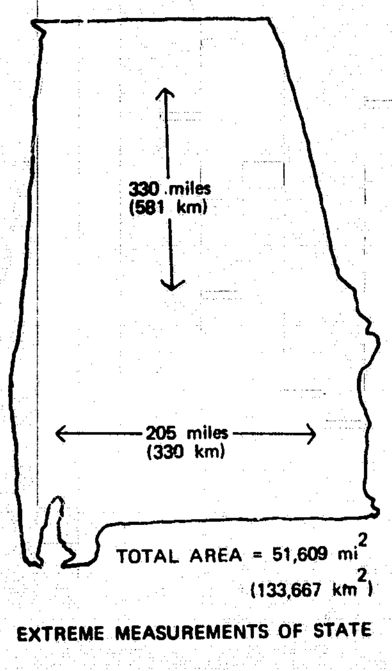
The next two pages provide pictorial reviews of grid cell selection, data capture, and a review of English to Metric conversions.



REVIEW OF METRIC TO ENGLISH CONVERSIONS AND THE ARIS USE OF THE UTM GRID



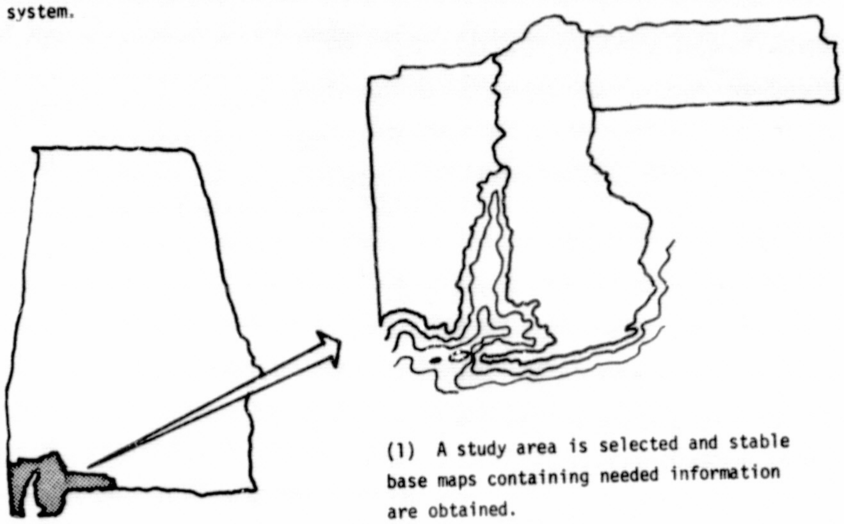
The Universal Transverse Mercator (UTM) grid was chosen for ARIS. It is based on a one kilometer square grid. These diagrams provide conversions from the one kilometer grid square to the English system of measurement.



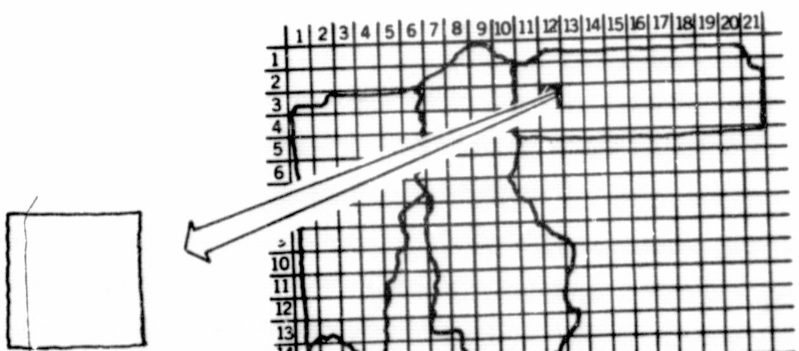
EXTREME MEASUREMENTS OF STATE

GRID CELL CONCEPT OF DATA CAPTURE AND STORAGE

In ARIS, one of the primary techniques for data capture and storage is the GRID system.



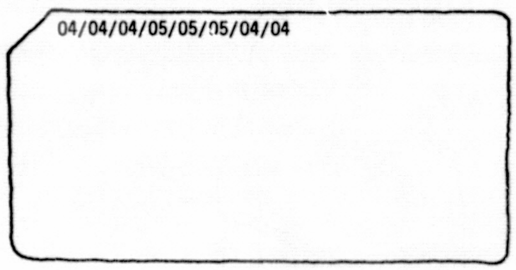
(1) A study area is selected and stable base maps containing needed information are obtained.



CELL (3,12)
This cell is taken from row 3 and column 12.

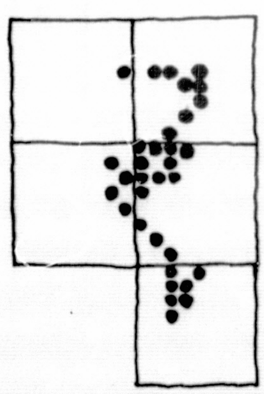
(2) A uniform grid is laid over the study area and fixed to a base point, related to the Alabama base point, so that all future data can be aligned to the same grid within the UTM system.

(3) Codes are recorded indicating the data for a single variable for each cell. Recording begins for the cell in the upper lefthand corner and moves along the row to the right, as one would read. When a row is completed, the process repeats, beginning with the left end of the next row.



SOIL NUMBERS shown recorded for cells (1,1) through (1,8).

(4) Finally, data when stored, is accessed by the software and related by its cellular (both geographic and computational) location. The software can relate the data for a specific cell from several data bases to aid in geographical analysis. For example, to find those locations having a specific soil type, certain slope characteristics, and quantity of surface water.



C 2

ARIS
purpose and structure

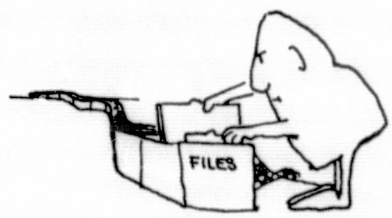
PURPOSE OF ARIS

One of the situations faced by planning and decision-making personnel is that an abundance of existing information dealing with state and local problems may exist but usually is:

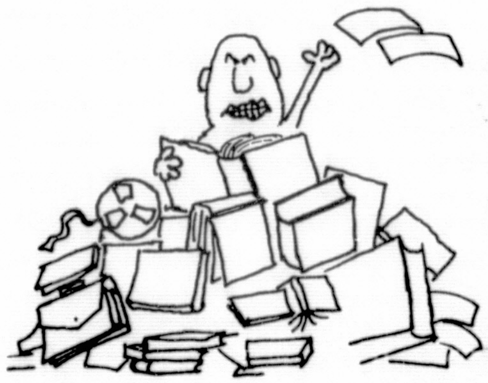
1. Unknown or unavailable,
2. In a form that is inconvenient or difficult to utilize, or
3. Too much data from which to select those data items relevant to the problem.

All of these concerns are compounded by the overall problem of data manipulation cost. This is also known as the per unit cost for information provided.

(1) Decision-maker does not know a portion of his required information already exists in another department.

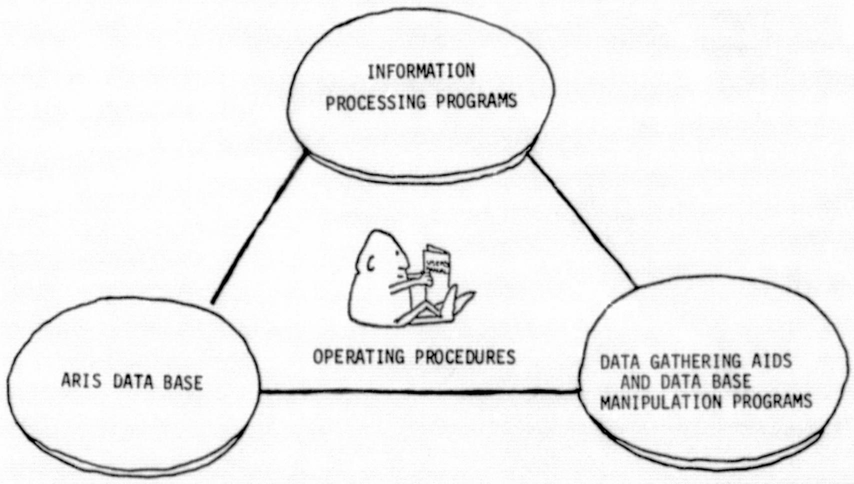


(2) Then there is always some information in "list" form when the decision-maker needs this information in graphic form or the information is at the wrong scale if it is available on a map.



(3) Finally, there is the mass of presently available information concerning everything and in which nothing can be found.

ARIS is a three-phased approach to reduce or eliminate these difficulties. This can be and is being accomplished by the development of an automated geographic analysis and computer mapping system which requires a minimum of user effort but provides a maximum of assistance to the user. The system is built around a computer accessible, uniformly structured, and self-indexing data base. A decision-maker, using both the ARIS software and a complete description of the resources area (data base), can develop the proper relationships which lead to possible alternative approaches to the problem. Iterations consisting of varied sets of views of the geographic and other resource information, coupled with an analysis of the importance and relationship of the information components can lead to feasible solutions. ARIS is designed as a system comprised of a data base and a set of computer programs which, along with operating procedures, will work with the data to provide information in a form that is valuable to the decision-maker.



ARIS HAS THREE MAIN COMPONENTS:

(1) Data bases

(2) Data gathering aids and data base manipulation programs

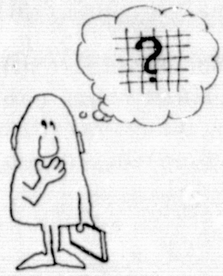
(3) Information processing programs. (These programs are directly responsible for handling user requests for information and/or analysis).

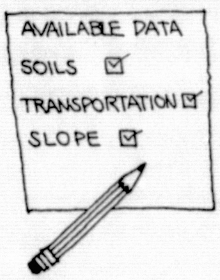
Along with these components are provided operating procedures for using or connecting the components.

Now that the geographic nature and the structure of the ARIS DATA BASE have been established, a simple discussion of how an ARIS user might solve a problem can be introduced.

FLOW DIAGRAM OF ARIS PROBLEM

(1) User identifies a problem that may be solvable, or at least become better understood, by using the ARIS geographic/grid or CENSLIST/HOUSLIST search approach.



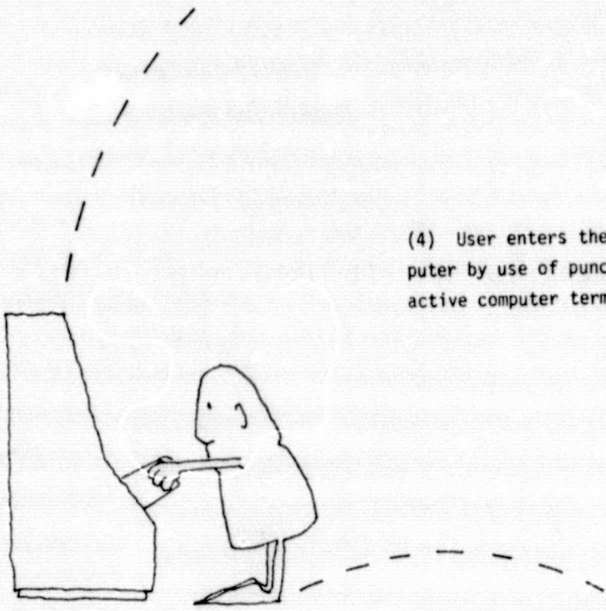


(2) User lists data to be used as criteria for solving the problem and checks for availability in the ARIS data base.

(3) User establishes an algorithm (describing the relationship between the involved variables) for obtaining solution to the problem from available data. At this point, the decision-maker may determine: (a) that other variables are pertinent and return to step 2, (b) that necessary data is not available and must be acquired and inserted prior to continuing, (c) that the geographic/grid approach is not suitable and terminate current efforts, or (d) that ARIS supplies a needed tool and continues the process.

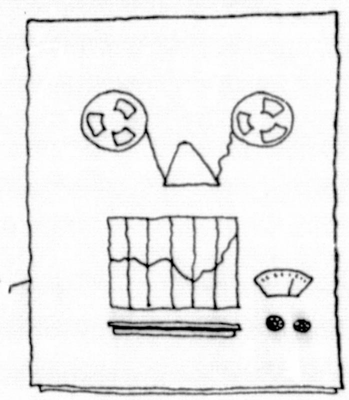
i. check soils file for type 4
ii. if true, test for available transportation
iii. search surrounding cells for small slope value

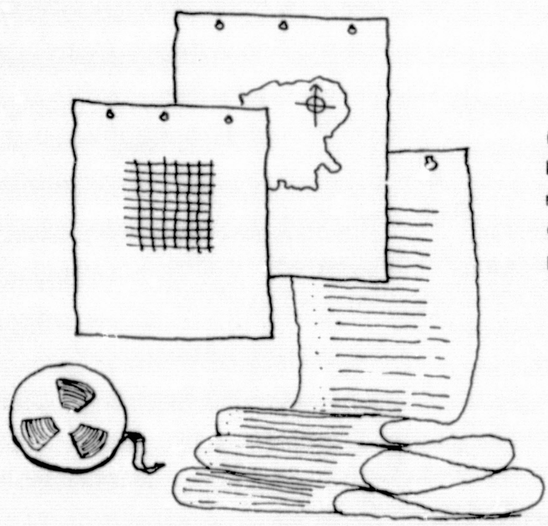
MAP
STOP



(4) User enters the problem into the computer by use of punched cards or an interactive computer terminal.

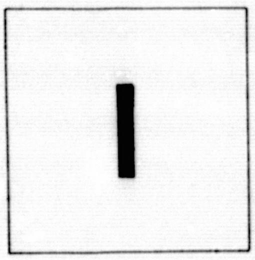
(5) Problem is fed to computer.



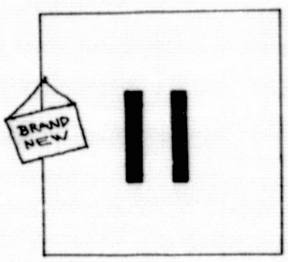


(6) Output is developed and returned based on the user's requirements. This may include printed graphics, plotted graphics, and printed lists, or computer files.

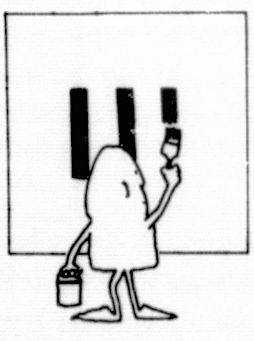
ARIS DEVELOPMENT IS DIVIDED INTO THREE PHASES :



ARIS I - Implemented



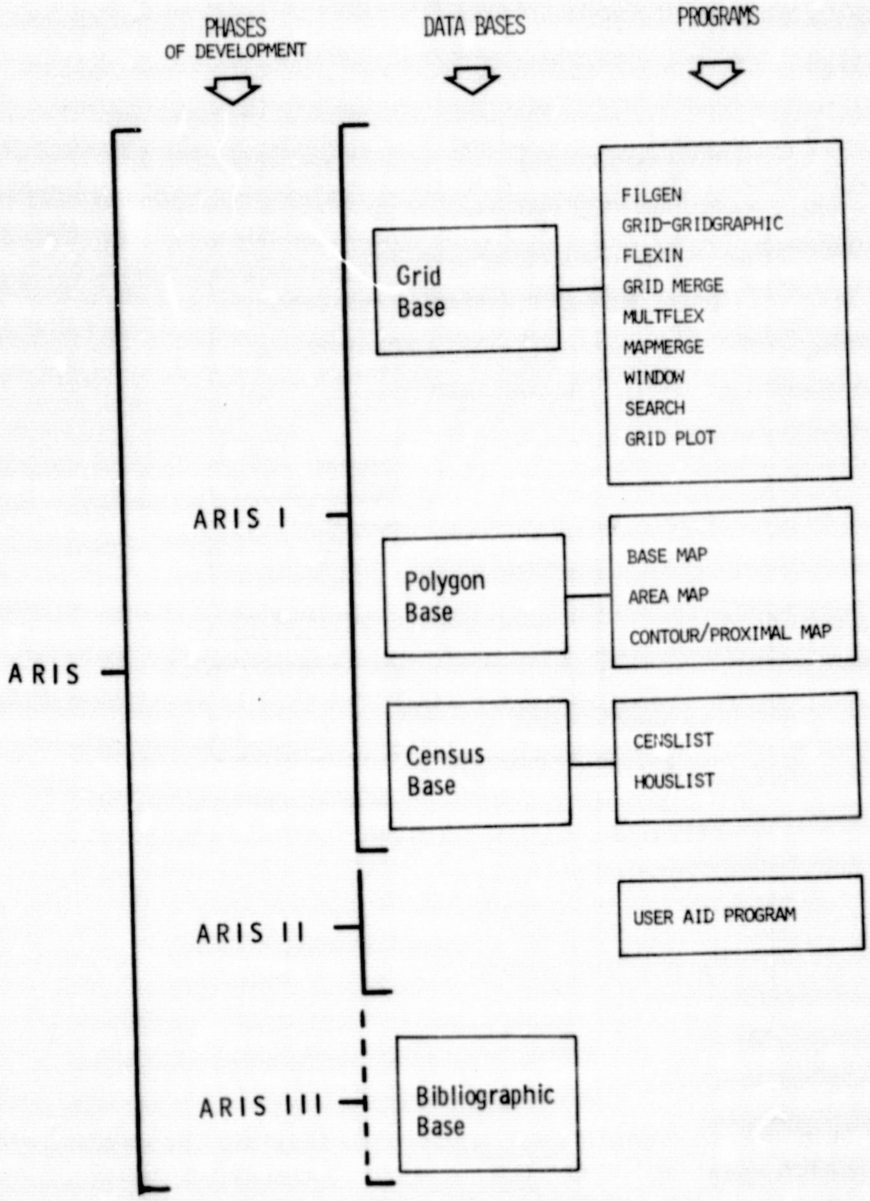
ARIS II - Currently under development
(June 1976)



ARIS III - Future considerations to improve and extend the ARIS capability.

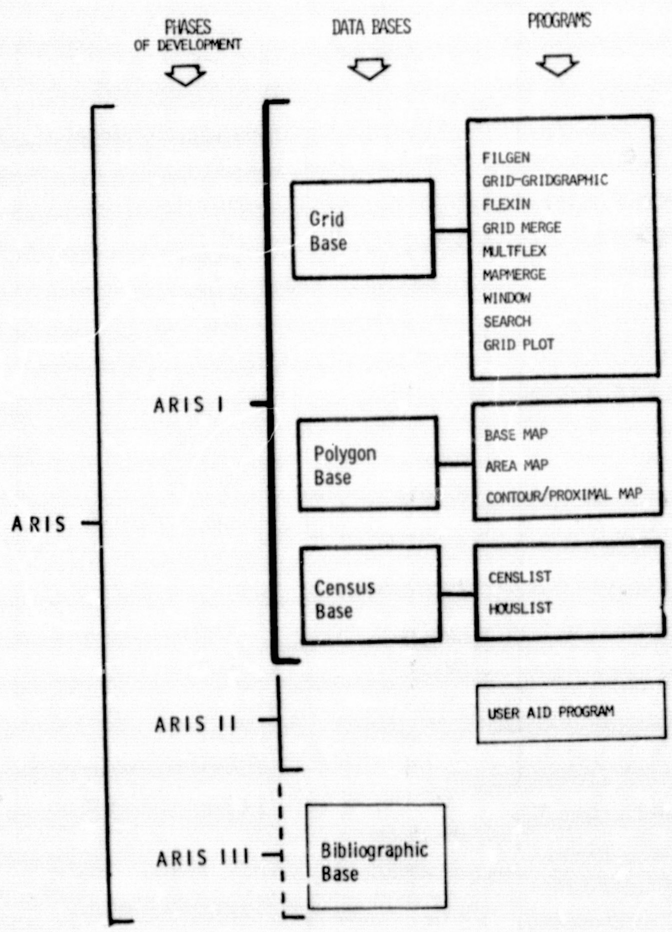
The configuration of each ARIS phase is explained in the following pages.

ARIS STRUCTURE AND PHASES OF DEVELOPMENT



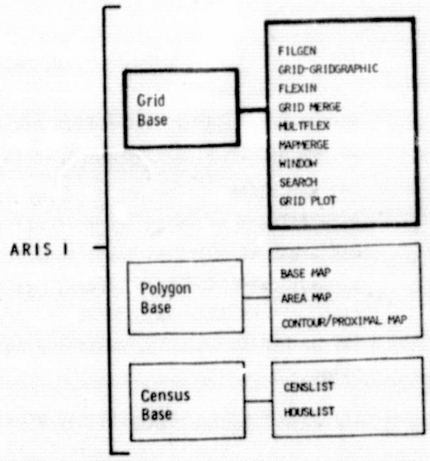
ARIS is built by Data Bases and programs. The diagram above indicates the way these are organized and their present state of development according to the phase they correspond to.

ARIS I



This phase consists of a set of separate programs which deal with census data or geographic data. Included are: computer programs developed at Auburn to access census population and housing data (CENSLIST/HOUSLIST) and acquired programs which work with GRID or POLYGON data bases (ARIS - GEOGRAPHIC).

Grid Base



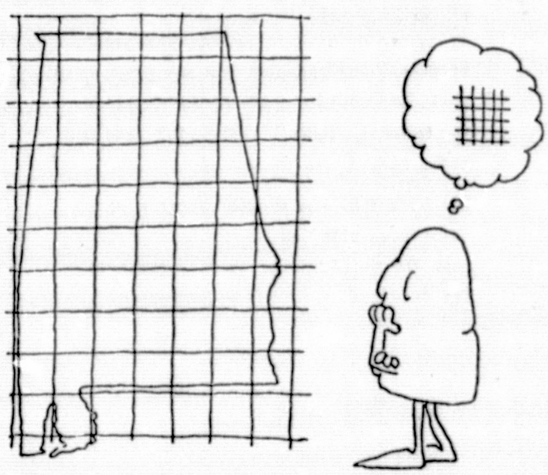
This type of data base has been previously explained in the "Grid Cell Concept of Data Capture and Storage". It consists of nine programs:

(1) FILGEN - a program for efficiently storing grid cell information from cards or tape into new computer files for re-use by other grid analysis software.

(2) GRID GRAPHIC - is used for producing graphic output for geographic areas in the form of printer graphics. The program can also produce frequency plots, level calculations, and a series of scale variations.

(3) FLEXIN - this GRID GRAPHIC option can be used to model data derived from a single variable file (SVF). Simple weighting factors or more sophisticated algorithms can be applied to specific data prior to it being stored or mapped.

(4) GRID MERGE - can merge several single variable data files simultaneously or separately into an existing or newly created multi-variable data file (MVF). All data to be merged must cover the same geographic area.



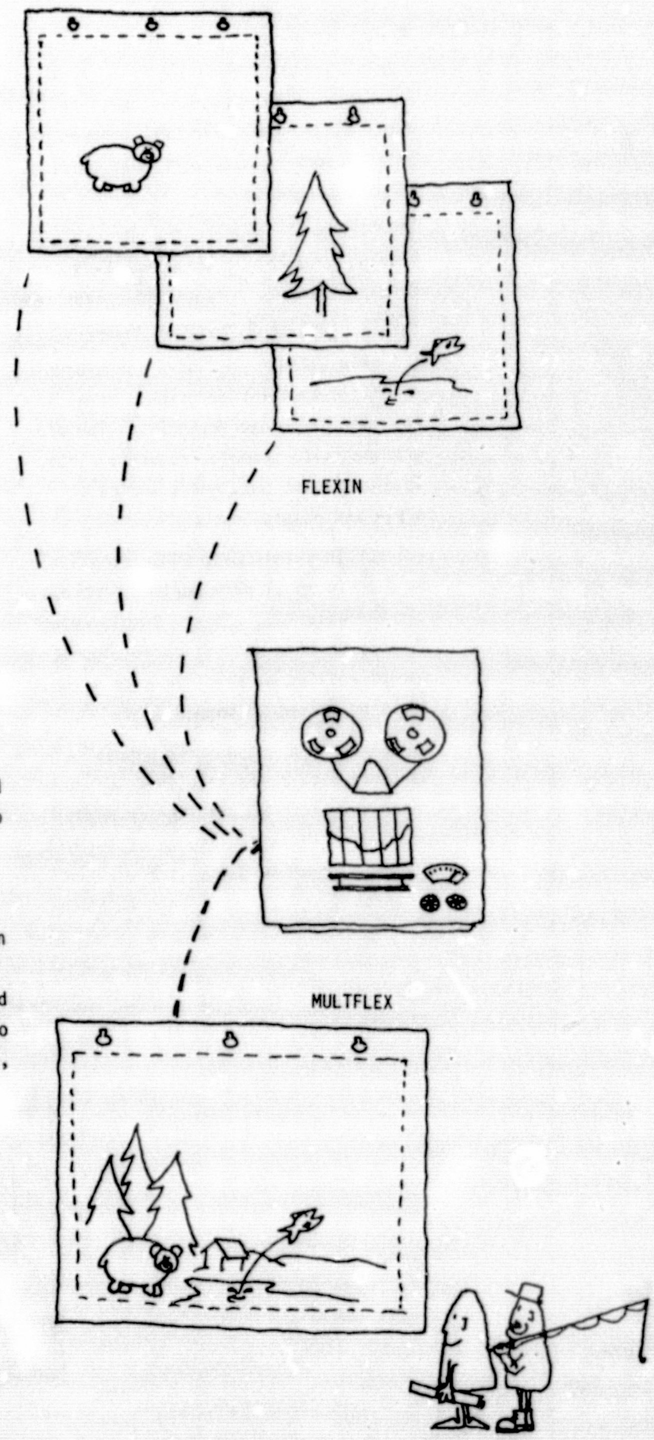
(5) MULTFLEX - is used to read, map, and model multi-variable files in the same manner GRID GRAPHIC and FLEXIN are used to operate on single variable files.

(6) MAP MERGE - is capable of merging data files for two adjacent (contiguous) map areas if multi-variable data files already exist for these areas. It can also perform like GRID MERGE and merge SVF or MVF to existing multi-variable files.

(7) WINDOW LIST - a program to provide numerical printouts of single cells or groupings of cells wherein it is desired to present a profile of environmental and cultural information in a listed form. The program can also be used to isolate a subset data file from a larger data base wherein specialized mapping or analysis might be needed.

(8) SEARCH - provides an analysis of sub-routine to compute geographic distances between various types of phenomena stored in the data base. It can also be used to summarize the occurrence frequency of a given phenomenon within a specified distance from a particular grid cell. This program produces new data files which can be mapped or used in various modeling efforts. For example, for any given grid cell, one could calculate the distance to the nearest highway, commercial land use, park, etc.

(9) GRID PLOT - a plotter program which interfaces with GRID GRAPHIC to produce maps for which higher quality graphics are required.



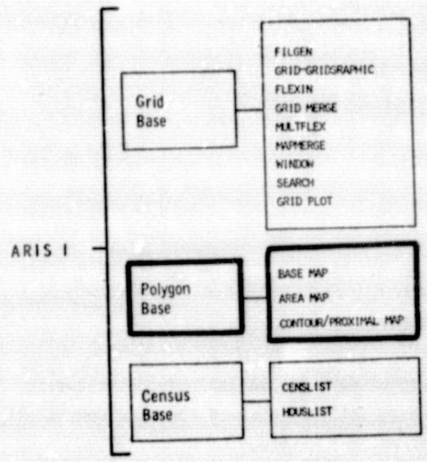
Polygon Base

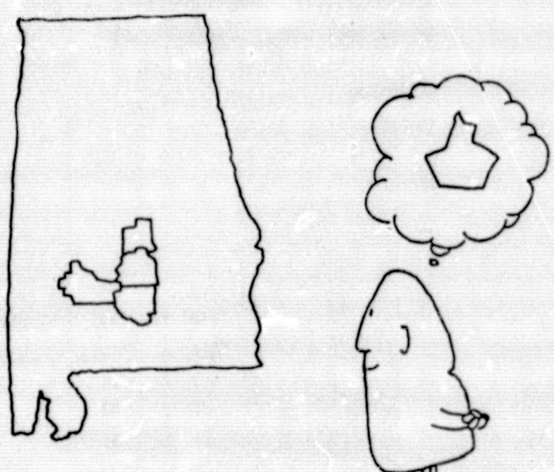
Data can be obtained for irregularly shaped areas formed by the grouping of square grid cells. These groupings can be manipulated in much the same manner as the square grid cells. A polygonal data base can be more accurate than cellular data, but computer manipulation thereof is far more time-consuming and hence, more costly. Programs:

BASEMAP - a program to create the Base Map Image File to be utilized by the next two programs, AREAMAP and CONTOUR MAP. This is the first step when dealing with polygon data.

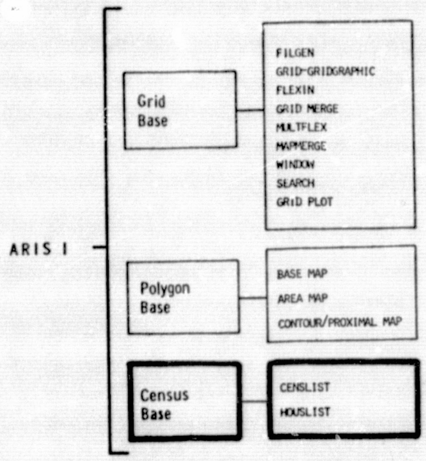
AREAMAP - is designed to input the Base Map Image File to produce thematic choropleth maps on a standard chain line printer. A variety of available user options permit scaling, shading, legend association and creation of a matrix file, containing the absolute values associated with each polygon cell.

CONTOUR/PROXIMAL MAP - is designed to input the Base Map Image File to produce contour and proximal maps. It also contains special user options to enhance the value of the output information.





Census Base

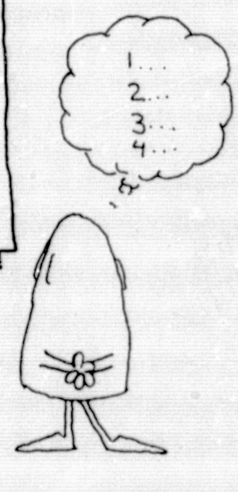


Census data is available from the system in a list form derived from the Census Bureau data tapes.

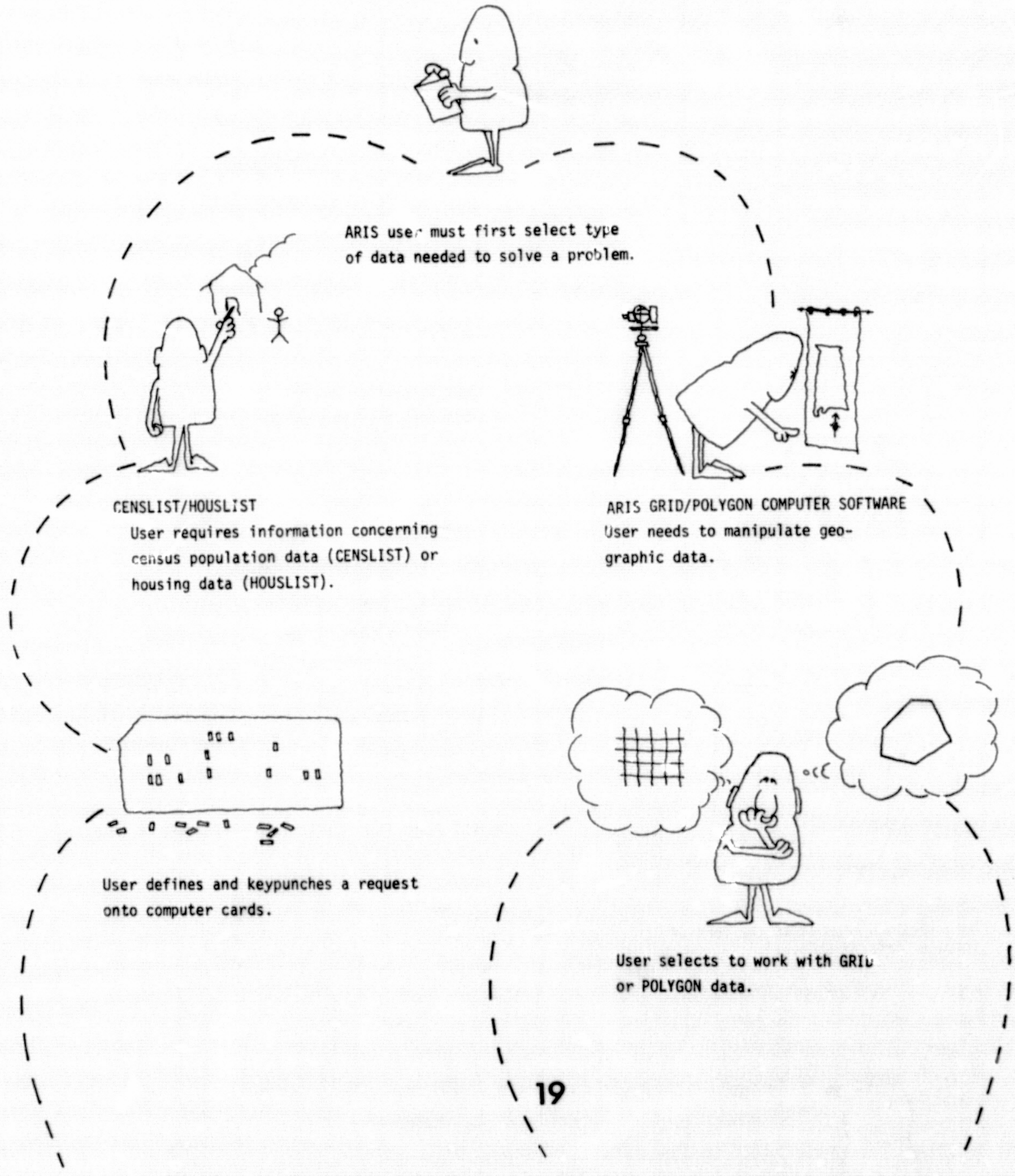
The ARIS census programs, CENSLIST/ HOUSLIST, have been developed to acquire meaningful information from a restructured set of U.S. Bureau of the Census data files. The files have been restructured by eliminating the many blank data elements found in the basic census files and then realigning the data into an Indexed Sequential Access Method (ISAM) data base. The realignment permits very high speed processing to be performed. CENSLIST and HOUSLIST prepare tabular output consisting of: (1) mere listings of portions of the data base, (2) aggregations of data from two or more Census County Divisions (CCD), or (3) the result of searching for those CCD's meeting certain criteria, e.g. CCD's in which fifty percent or more of the population is eighteen years of age or younger.

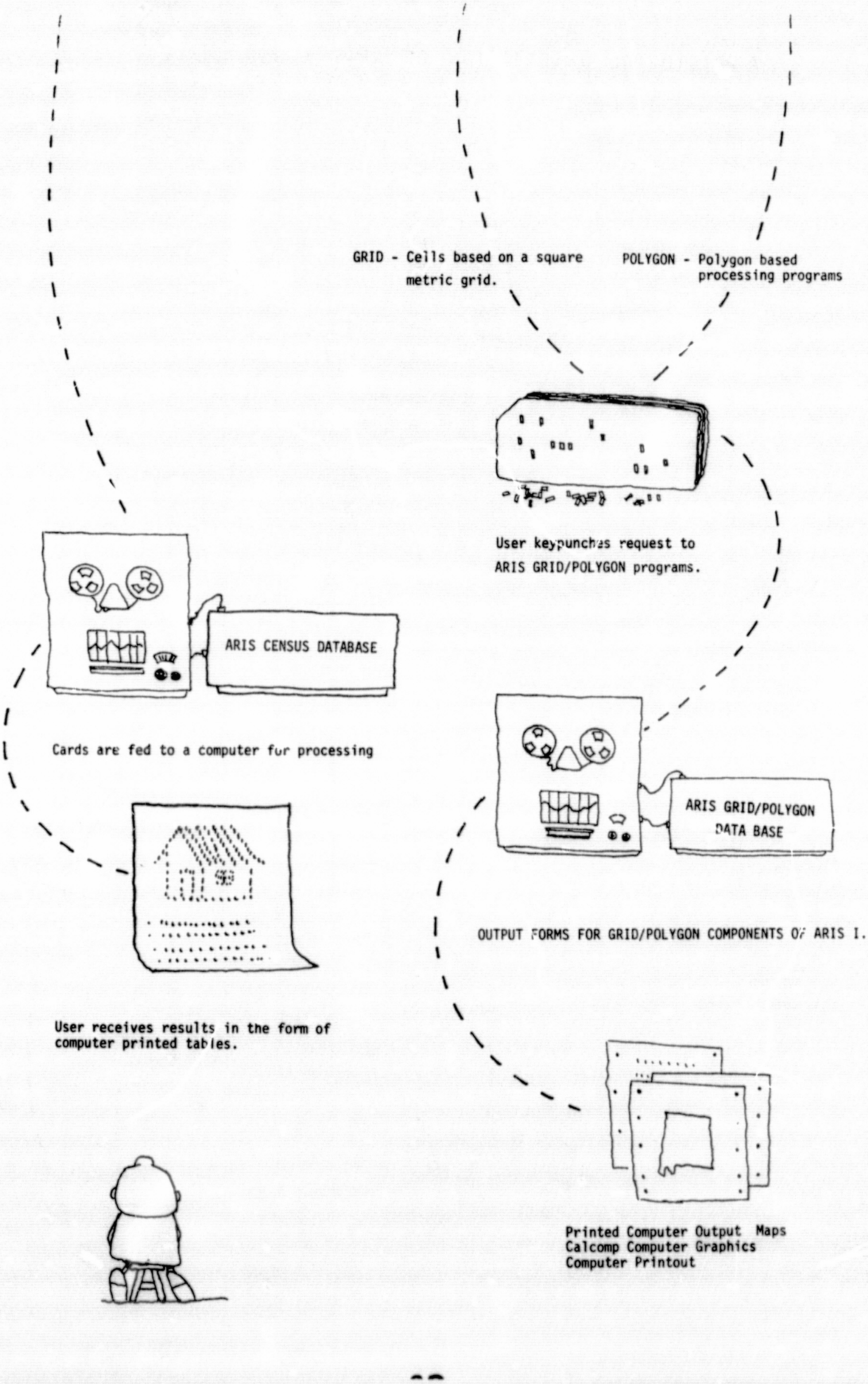
Table (Blank) County, Census Division 5,
Total Population By Age and Sex

Male	Female	Under 3
109	101	3-4
60	41	5
31	56	6
108	119	7-9
---	---	---

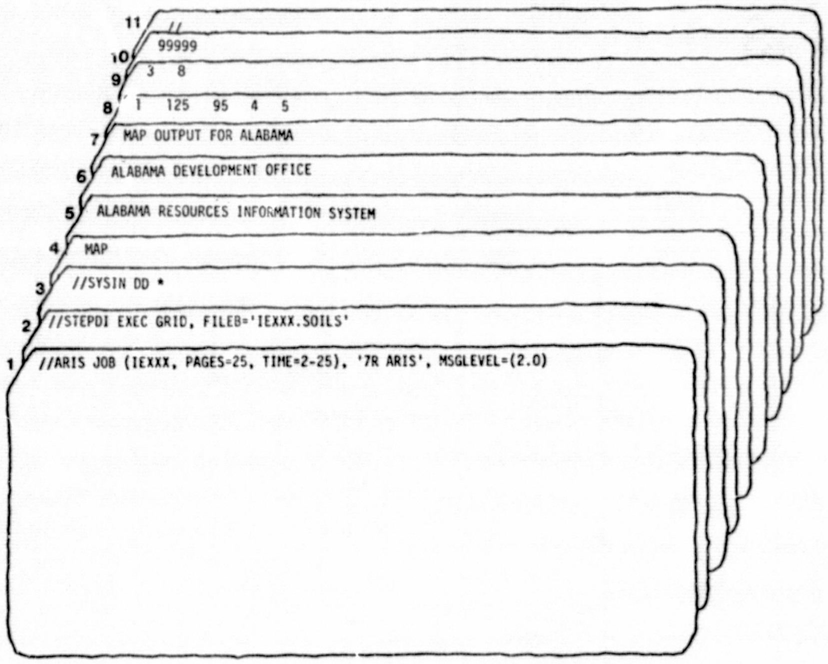


A PICTORIAL DESCRIPTION OF ARIS I USE



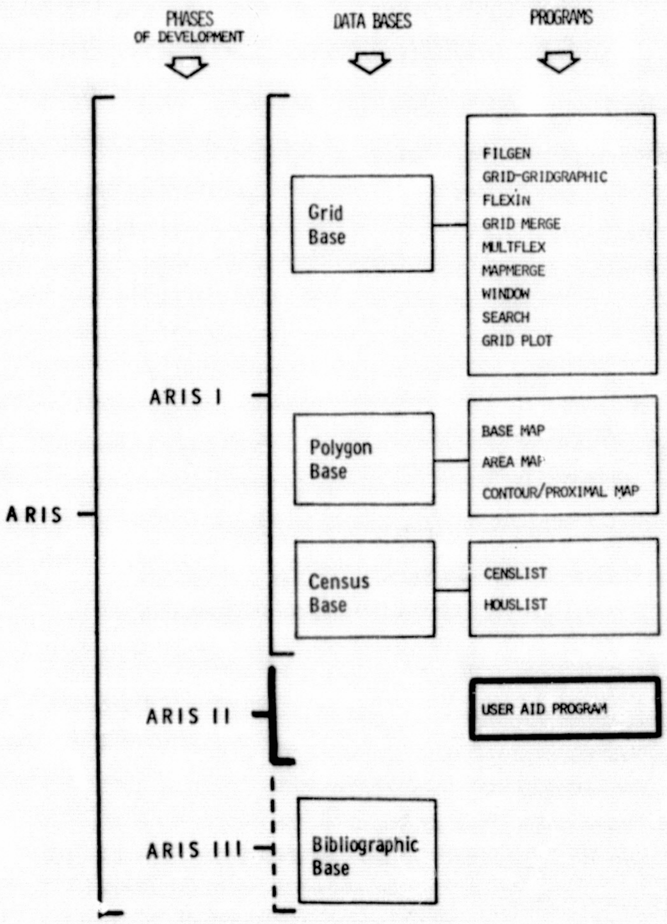

GRID - Cells based on a square metric grid.
POLYGON - Polygon based processing programs
User keypunches request to ARIS GRID/POLYGON programs.
ARIS CENSUS DATABASE
Cards are fed to a computer for processing
ARIS GRID/POLYGON DATA BASE
OUTPUT FORMS FOR GRID/POLYGON COMPONENTS OF ARIS I.
User receives results in the form of computer printed tables.
Printed Computer Output Maps
Calcomp Computer Graphics
Computer Printout

A TYPICAL ARIS I PROGRAM JOB SUBMISSION



The above job submission card deck is typical for use of ARIS I. The user must not only prepare all eleven cards, but have some understanding of the meaning of the material to be included therein. While cards 1, 3, and 11 are relatively typical system job control instructions, the remainder are not. In card 2, the user must specify both the ARIS program to use and the correct cataloged name of the data base. Card 4 is used to specify output type (MAP) and cards 5, 6, and 7 provide a heading or title for the output. Card 8 is used to describe the output. The first item represents the card type (1), the width of the map in grid cells (125), the height of the map in grid cells (95), the height of the cell in printer lines (4 - one half of an inch), and the width of the cell in printer positions (5 - one half of an inch). Card 9 denotes that a mapping function is to be performed (3) which has eight levels of detail. Card 10 serves to signal an end of input data condition to the processor.

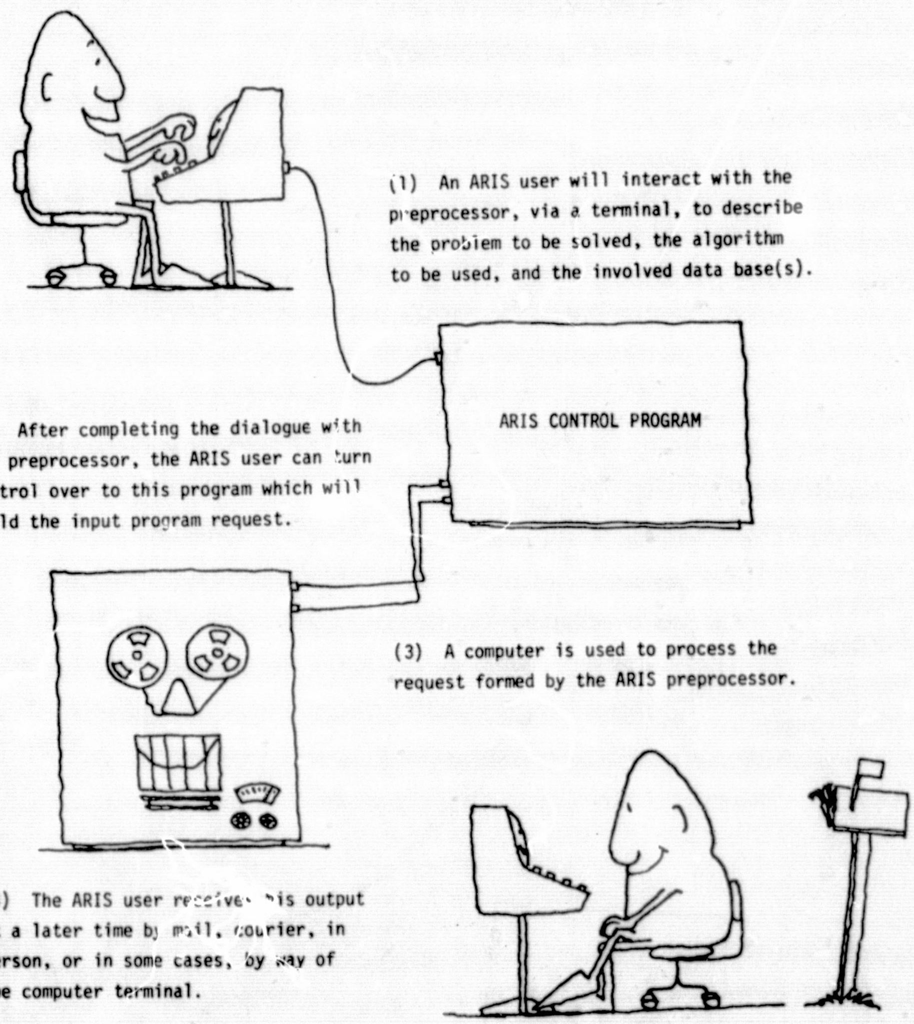
ARIS II



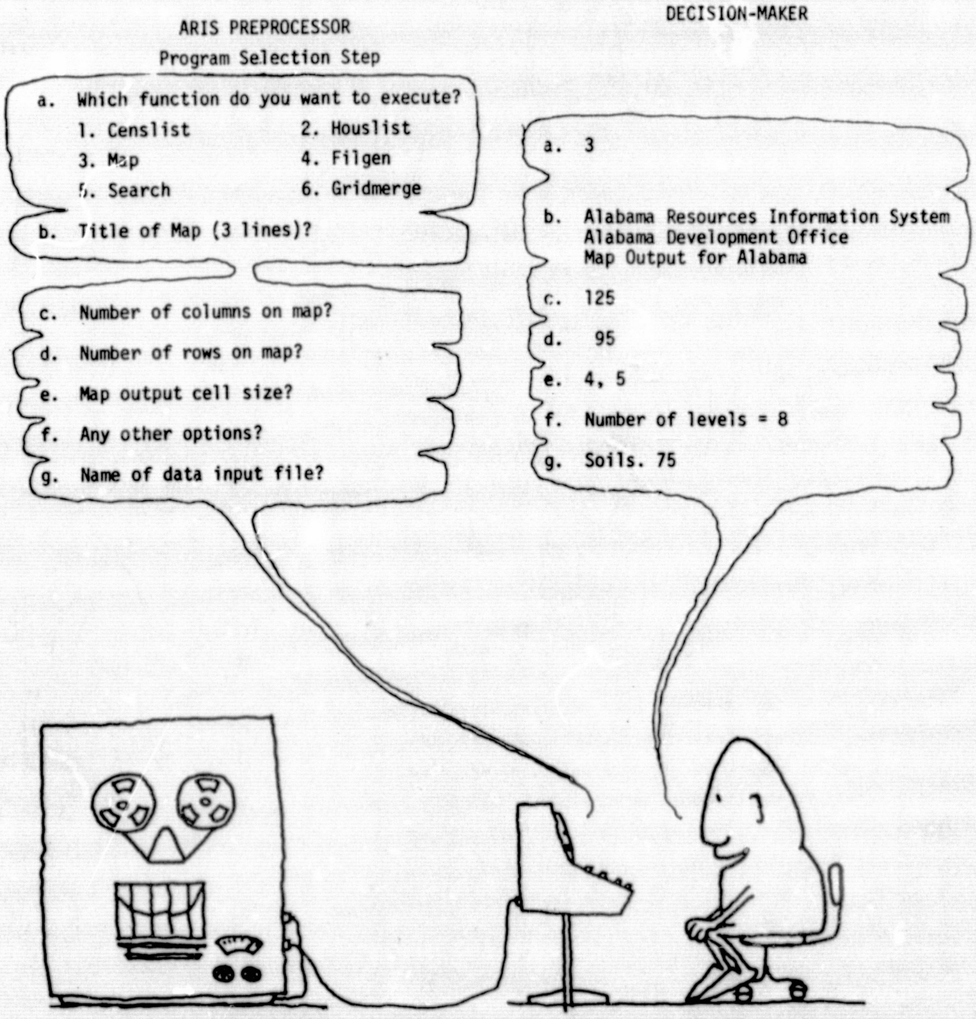
PHASES OF DEVELOPMENT
DATA BASES
PROGRAMS
ARIS
ARIS I
ARIS II
ARIS III
Grid Base
FILGEN
GRID-GRIDGRAPHIC
FLEXIN
GRID MERGE
MULTFLEX
MAPMERGE
WINDOW
SEARCH
GRID PLOT
Polygon Base
BASE MAP
AREA MAP
CONTOUR/PROXIMAL MAP
Census Base
CENSLIST
HOUSLIST
USER AID PROGRAM
Bibliographic Base

User Aid Program

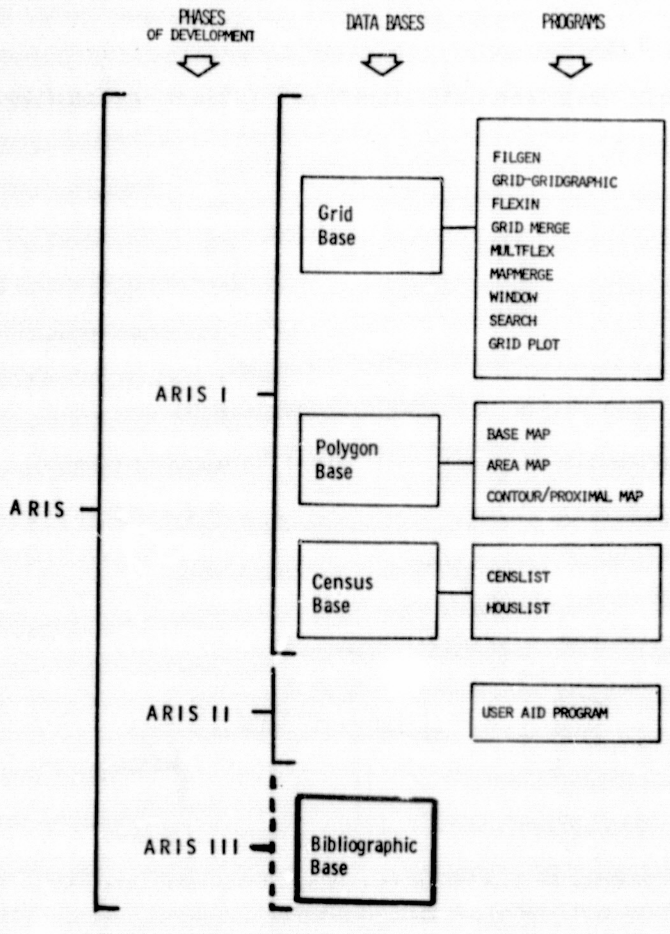
Phase II of the ARIS system consists of preprocessor software which performs some of the effort expended by the user in ARIS I. The user will merely identify his requirements to a program job supervisor who will take command of the individual program modules in ARIS. This process reduces the amount of effort required by the ARIS user by eliminating problems of job control language and tedious job step instructions.



A possible ARIS II dialog between the decision-maker and the preprocessor to a program job submission which leads:

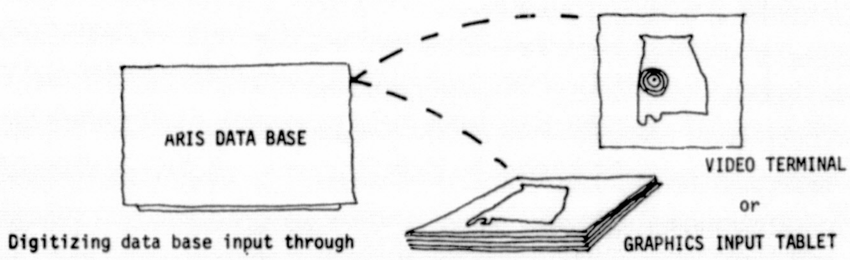


ARIS III

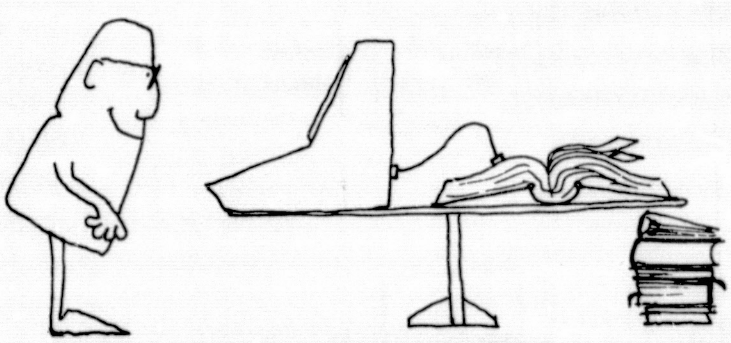

PHASES
OF DEVELOPMENT
DATA BASES
PROGRAMS
ARIS
ARIS I
ARIS II
ARIS III
Grid
Base
Polygon
Base
Census
Base
Bibliographic
Base
FILGEN
GRID-GRIDGRAPHIC
FLEXIN
GRID MERGE
MULTFLEX
MAPMERGE
WINDOW
SEARCH
GRID PLOT
BASE MAP
AREA MAP
CONTOUR/PROXIMAL MAP
CENSLIST
HOUSLIST
USER AID PROGRAM

Bibliographic Base

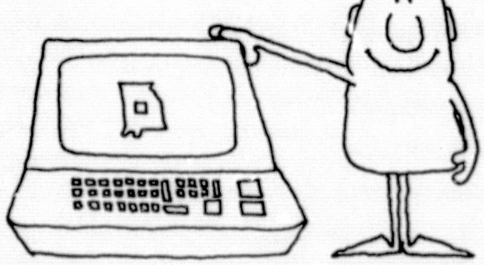
Possible future additions to improve system capability



Bibliographic data will include a computer indexed general bibliography for the State of Alabama.

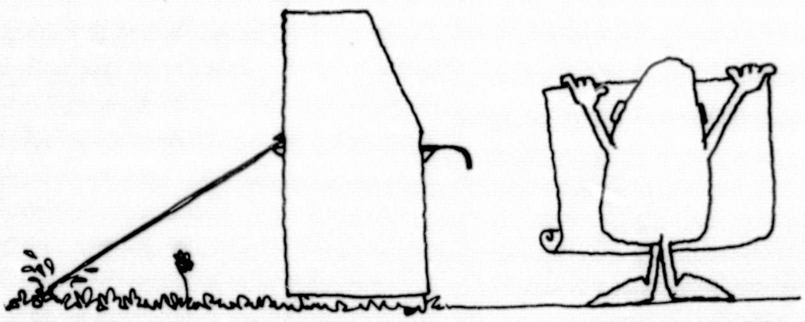


A series of computer programs for storing and retrieving bibliographic data concerning the publications dealing with the State of Alabama.



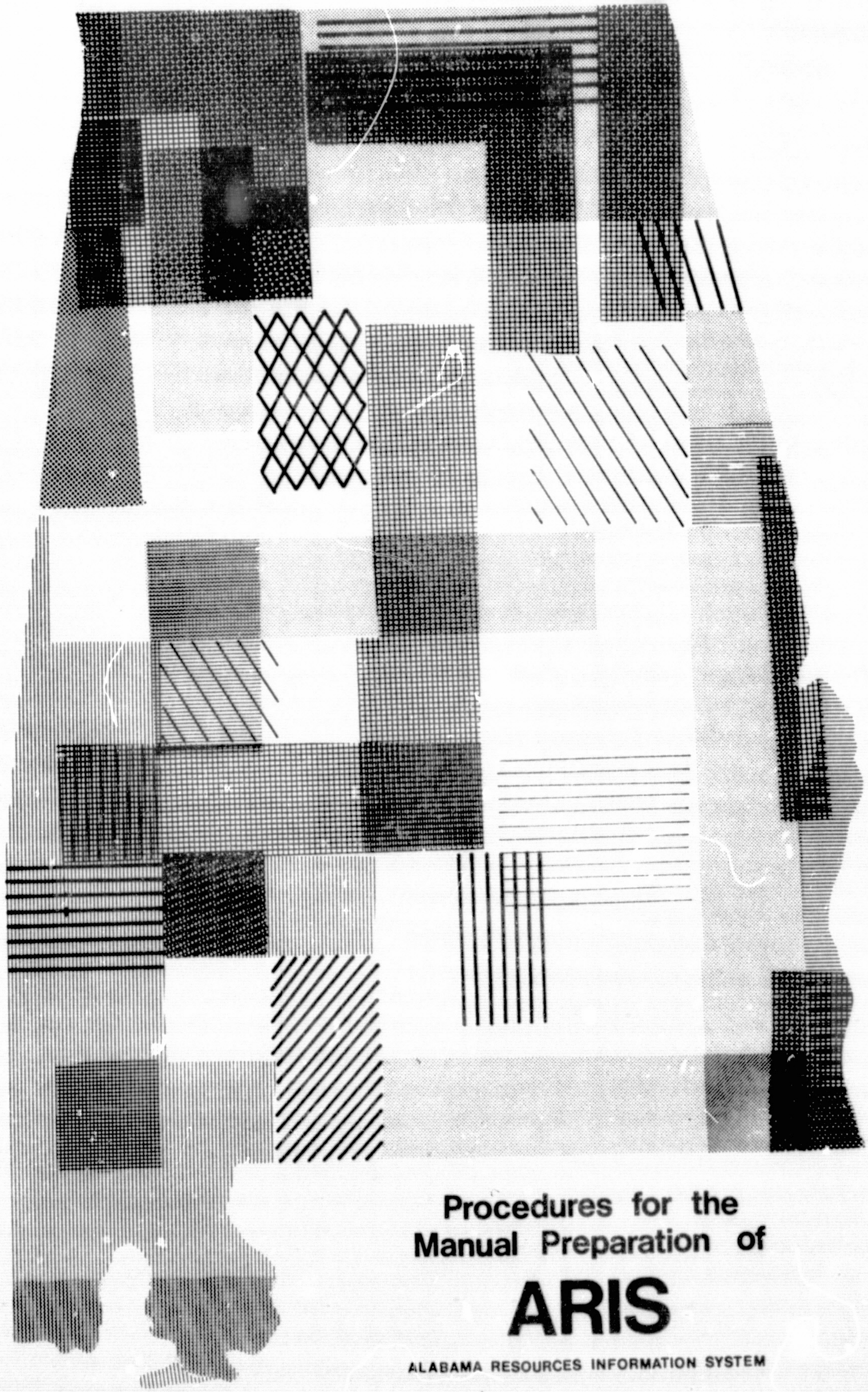
Use of ADVANCED GRAPHING II computer programs to directly store and interpret geographic information about the State. This system component adds greater accuracy for studying small areas of non-grid information.

CONCLUSION



ARIS has been designed to provide a minimal effort system for collecting, storing, and utilizing geographic information on land resources, economic activity, population and other material which becomes more meaningful and useful when given a spatial dimension.

Its primary task is to retain and operate on geographic data stored in a "grid" form. This "grid" form is based on overlaying a study area with evenly-spaced grid lines to form equal-sized cells. Information about these cells is then recorded in a uniform manner available to the computer to form a data base component.



Procedures for the Manual Preparation of

ARIS

ALABAMA RESOURCES INFORMATION SYSTEM

Geographic Data

Procedures for the Manual Preparation of

ARIS

Geographic Data

ALABAMA RESOURCES INFORMATION SYSTEM

DEVELOPED BY

AUBURN UNIVERSITY

UNDER CONTRACT WITH

NATIONAL AERONAUTICS & SPACE ADMINISTRATION

Contract NAS8-30654

ALABAMA DEVELOPMENT OFFICE

ALA-AU-X996-1000-6

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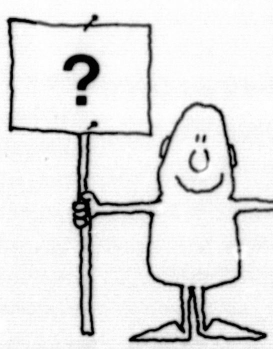
"The preparation of this booklet was financed in part through a Comprehensive Planning Grant from the Department of Housing and Urban Development, HUD P-1000; administered by the State Planning Division, Alabama Development Office, Office of the Governor."

PREFACE

This booklet, one in the series of ARIS publications, has been written to guide the system user in the manual encoding of geographic information for processing by the ARIS computer. For an overview of the ARIS system and its purpose, the reader is invited to read the booklet "An Introduction to ARIS", copies of which are available from the State Planning Division of the Alabama Development Office.

At this time, data entry to the various ARIS data bases is accomplished computationally after manual encoding has been completed. While commercial, automated procedures (e.g., tablet and stylus, optical, "x-y" digitizer) are available, they are expensive. As funding becomes available and system utilization warrants, automated procedures for ARIS data encoding will be developed and instruction manuals will be prepared.



INQUIRIES RELATIVE TO ARIS SHOULD BE DIRECTED TO THE ALABAMA DEVELOPMENT OFFICE, STATE PLANNING DIVISION, MONTGOMERY, ALABAMA

TABLE OF CONTENTS

Spatial Information Systems Concepts

GEOGRAPHIC DATA BASE CONCEPT

The primary method in ARIS for acquisition, storage, and utilization of geographic data is through the use of standard units of area, called grid cells. Important to the way the software functions, is the structure of the data base; the method of data storage for software retrieval and utilization. The structure of the data base and the method of data storage for software retrieval and utilization is important to the way in which the software functions. Areal informat[illegible] or variables, to be stored, such as topography [illegible]il type, are geographically oriented, while comput[illegible] storage is sequentially oriented. A system mu[illegible]xist which relates these dissimilar orientations. [illegible] is accomplished by the use of a locational referen[illegible] in the data.

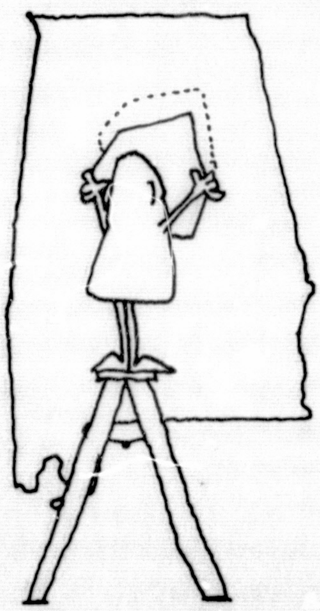
Suppose a large geographic area were subdivided into many small sub-areas. Each sub-area could then be more definitively described than the original area, because less variation would be likely to occur. A further reduction in the size of a sub-area would further increase the possibility of unique definition. At some point, perhaps one acre, a specific data category, such as "soil type" within the overall variable "soil" could be identified as that soil type most representative of the soils within the acre. This soil type could be considered to be discretely representative of the variable soil within the small areal unit.

If many of these areal units were placed side by side, both horizontally and vertically, with each representing a discrete soil type, a large area could be represented regarding the variability of soils. Similar capture of other geographic variables, such as slope, surface water, ground water, etc. (each separately), permits the complete geographic description of an area to be utilized by computer software. This system of contiguous areal units to represent a variable, such as soils, slope, or surface water, is the design basis for the ARIS geographic data system.

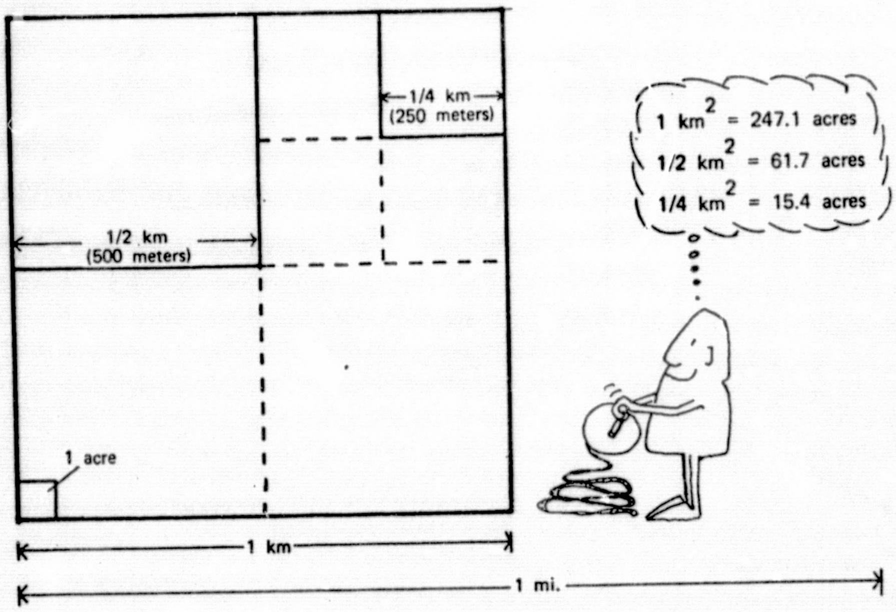
Since the earth has a generally rounded surface and since most cartographic representations of its surface are flat, another mismatch exists. Projections of surface features, boundaries, and their locations to a flat surface receive distortion from the true situation. The Universal Transverse Mercator (UTM) system for locating geographical attributes minimizes projection distortion with respect to the State of Alabama - Alabama is nearly in the center of UTM zone sixteen. For this reason, grid cells based on the UTM system have been chosen for use within ARIS.

It is expected that each data base relating to the entire State or used for state-wide analysis will encompass an area of one-fourth of a square kilometer (one half of a kilometer on a side). At the same time, those data bases having regional importance are expected to encompass an area of one-sixteenth of a square kilometer (250 meters on a side). All grid cells are to be related to a single unique extreme northwest point on a UTM grid overlaying the entire State. This will permit all separate data bases to be interrelatable with minimal boundary conflict. Theoretically, if cell data is related to the UTM system zone 16, then they are automatically interrelatable with no boundary conflict. From a practical standpoint, some conflict could occur.

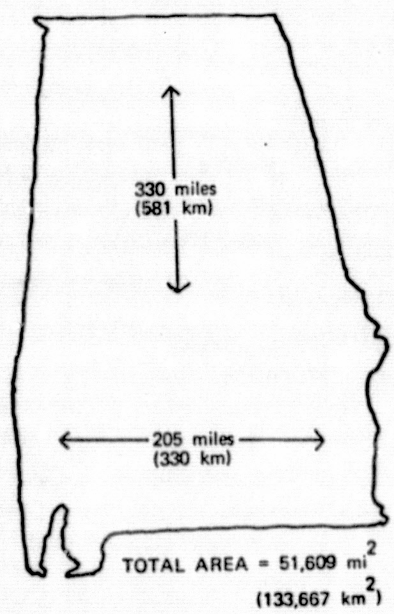
The next few pages provide pictorial review of grid cell selection, data capture, and a review of English to Metric conversions.



REVIEW OF METRIC TO ENGLISH CONVERSIONS
AND THE ARIS USE OF THE UTM GRID



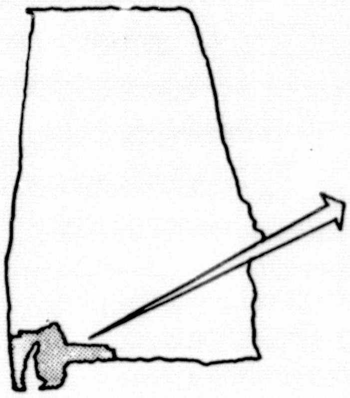
The Universal Transverse Mercator (UTM) grid was chosen for ARIS. These diagrams illustrate the relationships between the English system of measurement and the UTM system as it concerns ARIS.

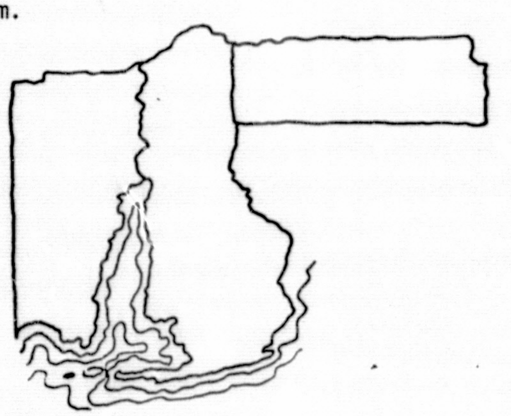


EXTREME MEASUREMENTS OF STATE

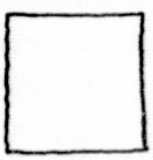
AN INTRODUCTORY SUMMARY OF THE GRID CELL CONCEPT OF DATA CAPTURE AND STORAGE

In ARIS, one of the primary techniques for data capture and storage is the GRID system.



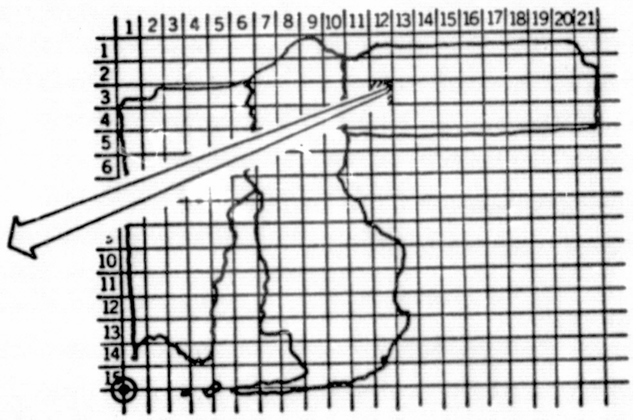


(1) A study area is selected and stable base maps containing needed information are obtained.



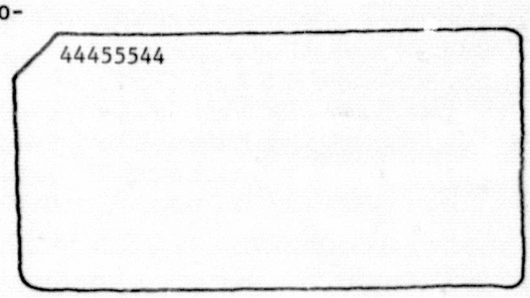
CELL (3,12)

This cell is taken from row 3 and column 12.



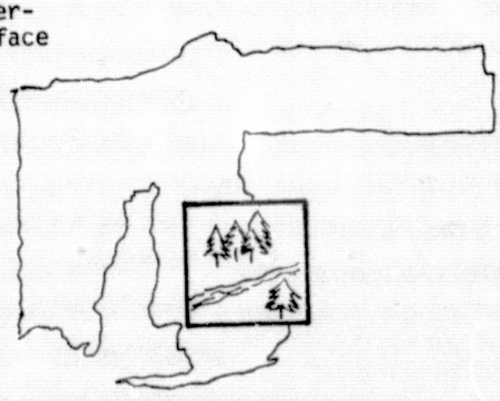
(2) A uniform grid is laid over the study area and fixed to the UTM coordinate system base point, related to the Alabama base point (Official Alabama Base Point: UTM easting of 350,000 meters and northing of 3,879,500 meters), so that all future data can be aligned to the same grid within the UTM system.

(3) Codes are recorded onto an encoding form, indicating the data for a single variable for each cell. Recording begins for the cell in the upper left-hand corner and moves along the row to the right, as one would read. When a row is completed, the process repeats, beginning with the left end of the next row. The information recorded on the encoding form is then key punched for computer processing.



SOIL NUMBERS shown recorded for cells (1,1) through (1,8).

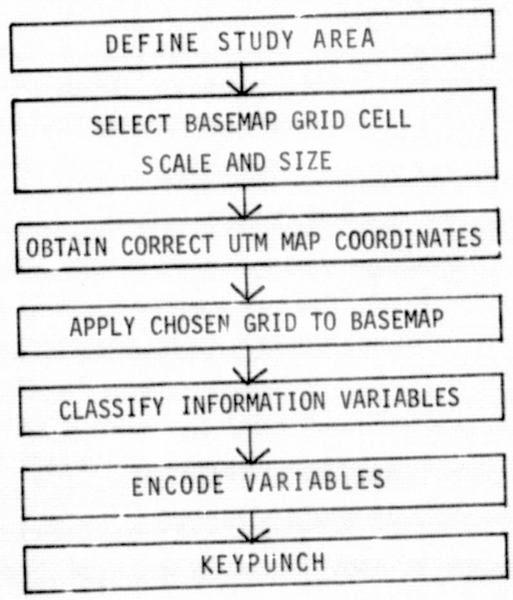
(4) Finally, data when stored is accessed by the software and related by its cellular (both geographic and computational) location. The software can relate the data for a specific cell from several data bases to aid in geographical analysis. For example, to find those locations having a specific soil type, certain slope characteristics, and quantity of surface water.



The ARIS Grid System – Data Encoding

THE ARIS GRID SYSTEM - DATA ENCODING

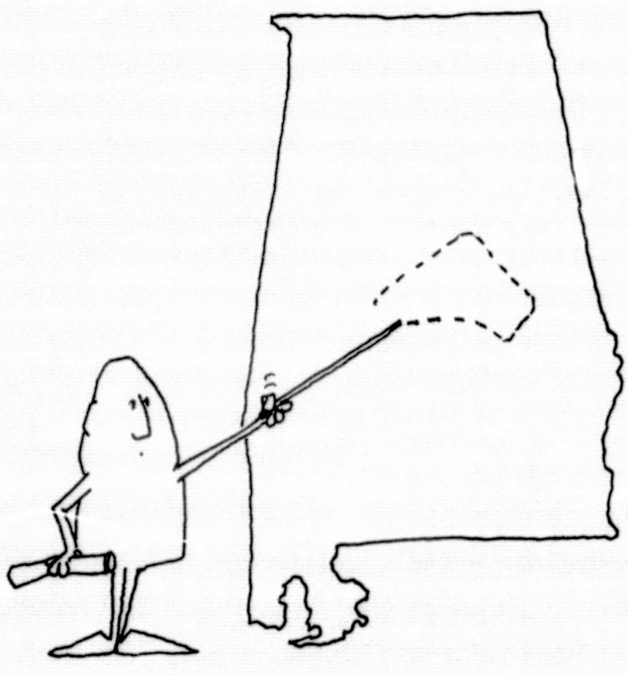
The matrix of geographically represented information is the basis for the information system's analysis capabilities. As discussed in the previous section, the data must be transformed into computer compatible notation. This transformation is called encoding, whereby a numeric symbol is chosen to identify a variable, such as topographic elevation, type of vegetation, type of soil, etc., which is most representative of a cell. For example, a sub-variable such as "clay" or "alluvial" is numerically coded to describe the variable "soils". The group of cells, each thus identified, will then collectively represent the variable, such as topography, vegetation, soil, etc., in turn represented by the total matrix. Once encoded in numerical terms, the variable can be stored within the computer in a digital data matrix. Usually, several data files are similarly created for a specific area, with each file representing a different geographic variable. Once created, they can be stored separately as single variable data files, or merged by the computer into one or more multi-variable data files. The encoding procedure is similar for each variable, although special considerations may sometimes be necessary due to map scales, quality, and type of available information, etc.



ENCODING PROCEDURE

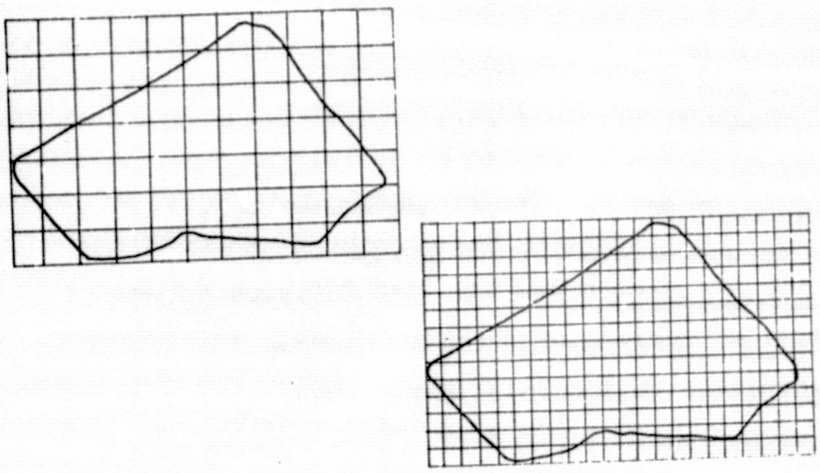
DEFINING THE STUDY AREA

The first step to encoding geographically disposed variables is a definition of the area to be studied. First, a map is chosen which will serve as a "Basemap" for all geographically identifiable variables which are to become part of the computer's information system. This chosen "Basemap" must be of a scale which will adequately allow for the necessary detail of the chosen variables to be acquired. When variables are to be added, determine if all or part of the "Basemap" is necessary for the study or studies which eventually may be necessary, and draw the outline of this study area on the "Basemap".



SELECTING THE BASEMAP GRID CELL SCALE AND SIZE

There are two important considerations in choosing the grid cell scale and size. The first is the desired accuracy of the study. The second is the desirability of certain map cell sizes.



Selecting the scale of the grid cell (the amount of actual land area that each cell represents) is critical to the analysis of an area. Too large a grid causes excessive generalization of data; too small a grid requires more data to be encoded than is needed, a waste of time and money. Since the size of the cell determines the accuracy of subsequent analysis, it should be calculated in light of the accuracy required. On small applications where high accuracy is required, cells representing 10 meters by 10 meters of land area have been used with good results. On large scale studies, grid cells of 100 meters by 100 meters of land area have been successfully used to produce a more generalized analysis.

It is expected that each data base relating to the entire State, or used for state-wide analysis, will encompass an area of one-fourth of a square kilometer (500 meters on a side). Correspondingly, those data bases having regional importance (i.e., county or part of a county) are expected to encompass an area of one-sixteenth of a square kilometer (250 meters on a side). Multi-county or single county areas would usually use the one-fourth of a square kilometer cell. While nearly any cell size is possible, addable fractions of a square kilometer (four one-sixteenths equal one-quarter) will permit accurate aggregations from one cell scale to another to be performed computationally rather than manually. For example, a data base for state-wide analysis can be formed directly from a set of regional data bases because one is a precise sub-division of the other. A scale hierarchy consisting of a square kilometer, one-fourth of a square kilometer, one-sixteenth of a square kilometer, one-sixty-fourth of a square kilometer, etc., will permit a high level of data collection and encoding economy along with maximum analysis capability.

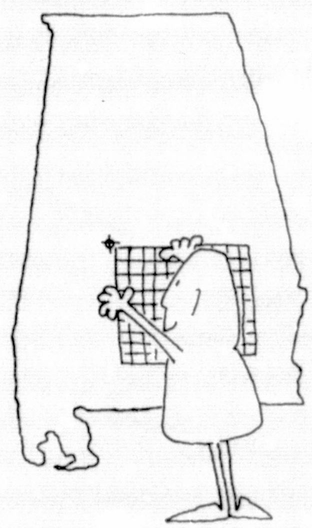
OBTAINING THE CORRECT UTM MAP COORDINATES

The casual user of maps may find the initial exercise in obtaining UTM coordinates to be a fearful experience. This is not really the situation. While certain equations are presented, they are included only for background purposes. The vast majority of effort is merely that of table lookup and the making of a few marks on the maps. In addition, current maps of federal preparation (U.S. Geological Survey, U.S. Army, etc.) normally contain UTM reference marks and therefore are not fully subject to the contents of this sub-section.

Two appendices (A and B) have been included for use in obtaining the UTM coordinates. Appendix A contains tables covering all latitudes within the State of Alabama. These tables are structured in ten minute intervals from 30 degrees through 35 degrees latitude. Contained within are the UTM coordinates for various longitudes east and west of the 87° central meridian and intersecting with the 10 minute intervals of latitude. Appendix A also contains an example of the use of these tables. Appendix B contains tables similar to those found in Appendix A except the interval sizes are 7.5 minute rather than 10 minute.

In general, to incorporate UTM reference marks onto an existing map, only a few steps are necessary. Following the detailed example in Appendix A and using the tables from either Appendix A or Appendix B, obtain the grid coordinates of the four corners of the map. At each corner compute the grid distances to the first easting and northing grid lines. (these are in latitude and longitude) falling wholly within the sheet. This is a matter of simple subtraction and conversion to inches at the drafting scale of the map. Round off the resultant inches measurement to the nearest one-hundredth of an inch. Attempts at precision finer than one-hundredth are generally fruitless. Measure these distances directly on the graticule neatlines (the network of lines of latitude and longitude upon which the map is drawn) of the sheet near the map borders. (Theoretically, this is incorrect because these are grid distances obtained by taking the differences of grid coordinates and therefore should be measured in the direction of the grid which is at an angle to the graticule; but practically, for the six degree transverse Mercator zones, the error in doing this is slight and usually may be neglected. The true neatline plotting distances may be obtained by dividing

the grid plotting distances by the cosine of the mean grid declination of the sheet. The maximum grid declination at the edge of the overlap of a zone is little more than two degrees, forty minutes and with a plotting distance of three inches, the calculated correction obtained is approximately 0.003 inch. For smaller declinations and shorter plotting distances, the correction is even less. In the majority of cases, the correction is merely 0.001 inch. Since for ARIS purposes, precision beyond the nearest 0.01 inch is considered unnecessary, the noted correction for error caused by declination is even less necessary.)



The UTM reference marks should be placed on the map near three or four of the corners at intersections of even UTM kilometer (1,000 meters) points, as 3,201,000 is correct while 3,201,060 is incorrect (last three digits must be zeros for meter to whole kilometer conversion). Interpolation will be necessary in the measurement process. Whole kilometer reference marks will insure proper alignment with the Alabama Base Point.

APPLYING THE CHOSEN GRID TO THE BASEMAP

A grid matrix must be drafted onto the basemap or drawn onto a transparent plastic sheet and then overlaid on the map. It is preferable to maintain

a file of transparent overlays of different scales and, for each study to be completed, have the applicable scaled overlay photographically superimposed (printed) on the basemap. Work subsequent to initial coding will not then be subject to error due to minor variations in placement of the transparent plastic grid. The outside perimeter of the study area should be redefined so that it is coincident with the grid matrix. The overall grid matrix should remain rectangular in shape with the study area contained within it. If a transparency is to be laid over the map, tape the transparency to the map to prevent moving and if at all possible, do not remove it before encoding is completed. The upper lefthand cell of the grid (the point where the upper row and lefthand columns cross) is the origin of the matrix (i.e., the zero-zero reference point for data collection). The point shown with * should be the UTM coordinate of the first unit. During the encoding procedure, areas outside the study area, but within the matrix, are left blank. The matrix should be numbered beginning with cell (1,1) in the upper left corner as shown in Figure 1. (See Appendix A)

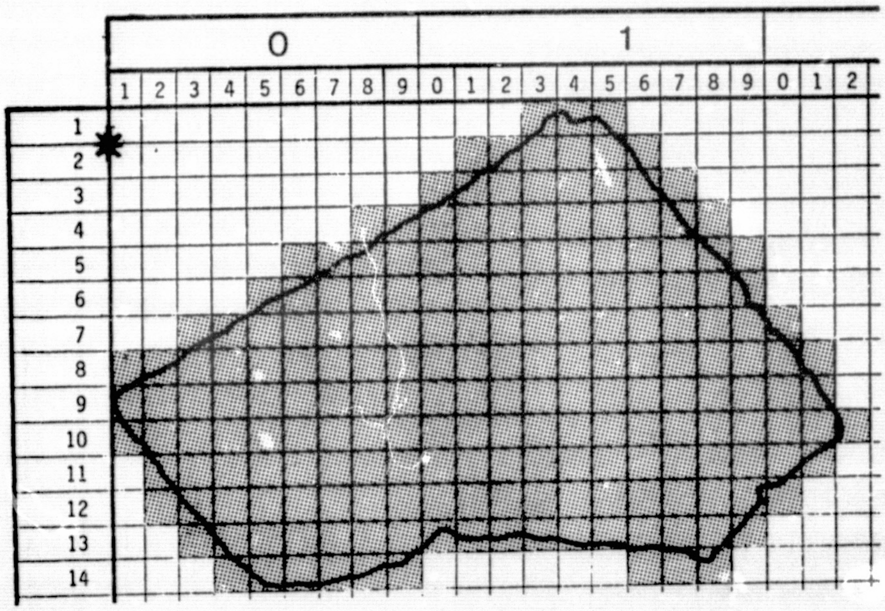


FIGURE 1

It is suggested that several basemaps be printed with the superimposed grid matrix, so there will be at least one basemap for each variable to be encoded or if transparencies are used, they should be of stable material.

CLASSIFYING INFORMATION VARIABLES

There are two basic types of encodable data - quantitative and qualitative. Normally, quantitative data is recorded with the actual quantitative value most symbolic of the cell. For example, topographic elevation would be coded as the actual elevation (estimated in feet or meters) at the center of the cell.

Qualitative data is usually recorded by identification with a representative numerical code. For example, the variable "soils" might be sub-divided into the following sub-variable classes, represented by the indicated code numbers:

<u>Variable - "Soils"</u>

Sub-Variable	Code
Clay	1
Alluvial	2
Rocky Terrace	3
Sloping Brown Forest Soil	4
Flat Brown Forest Soil	5
Bedrock	6

In this example, a given grid cell with clay soil would be recorded as a 1 for that particular soil.

As another example, the variable "land use" might be sub-divided as follows:

<u>Variable - "Land Use"</u>

Sub-Variable	Code
Residential	11
Commercial and Services	12
Industrial	13
Transportation, Communication, and Utilities	14
Industrial and Commercial Complexes	15
Mixed Urban or Built-up Land	16
Other Urban or Built-up Land	17
Public and Institutional	18
Cropland and Pasture	21
Orchards and Horticultural Areas	22
Confined Feeding Operations	23
Other Agricultural Land	24
Herbaceous Rangeland	31
Shrub and Brush Rangeland	32
Mixed Rangeland	33

Deciduous Forest Land	41
Evergreen Forest Land	42
Mixed Forest Land	43
Streams and Canals	51
Lakes	52
Reservoirs	53
Bays, Estuaries, and Coastal Waters	54
Forested Wetland	61
Non-forested Wetland	62
Dry Salt Flats	71
Beaches	72
Sandy Areas Other Than Beaches	73
Bare Exposed Rock	74
Extractive	75
Transitional Areas	76
Mixed Barren Land	77

In order to maintain a state-wide consistency in the codes utilized to represent the various information variables, it is requested all ARIS users coordinate their efforts with State Planning Division of the Alabama Development Office. A centralized point of information exchange c[illegible] aid all users in meeting their needs.

ENCODING THE VARIABLES

It is useful to visualize geographically coded information in three dimensions (x, y, and z), where x represents the row of the data cell, y represents the column of the data cell, and z represents the geographically disposed information within the data cell. In other words, the point (x,y) represents a two-dimensional location on a map surface. The third dimensional indicator, z, represents some geographical characteristic associated with that location. Instead of coding x, y and z coordinates for each cell, a more efficient scheme was devised whereby x and y are inherently defined by their respective row and column order or sequence in the matrix, and the z sub-variable value is recorded according to its respective code value. Remembering that keypunching must follow, the data must be coded in correct order and follow a specific format necessary for the data being coded. The format depends on the number of digits used to represent the data variable. Coding forms used for this purpose may vary according to the desired formats. Two examples are shown as Figure 2, and are used to encode variables represented by one and two digit identifiers, respectively.

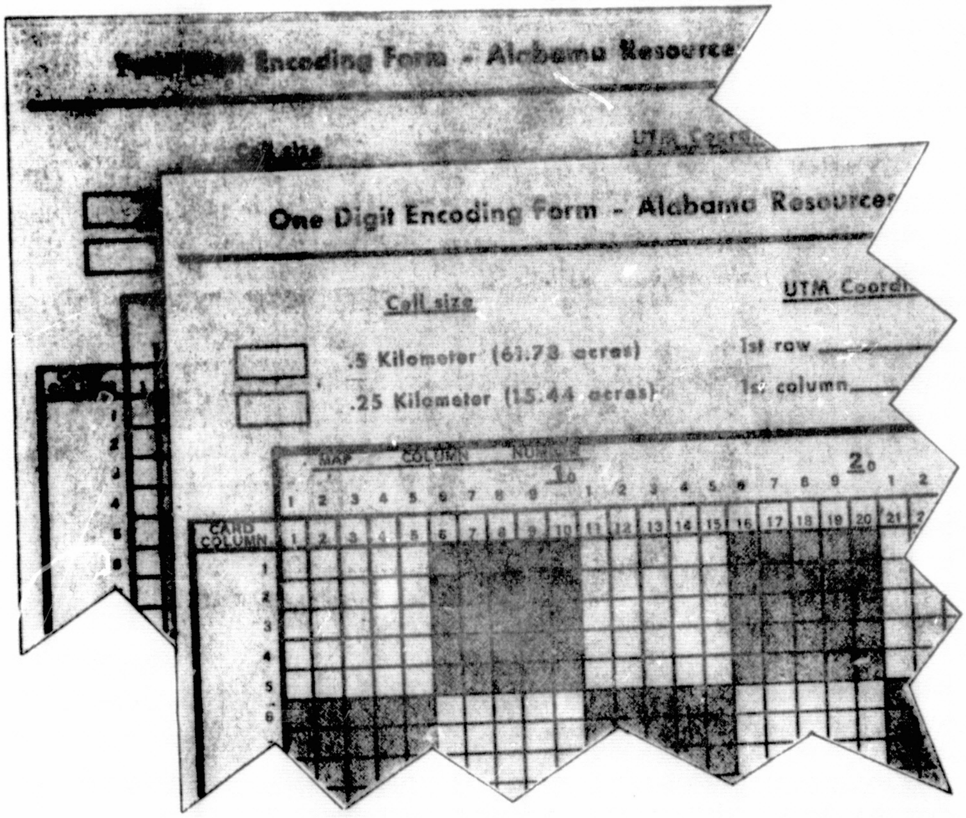


FIGURE 2

Complete examples (at reduced size) of both of the coding forms partially shown in Figure 2 are included as Appendix C.

Depending on the format and the size of the study area, each coding form represents all or part of a Basemap Data Matrix (grid). The coding form should be used so the cell representations on the form correspond respectively to the cells on the Basemap. Thus, in Figure 2, if a data variable represented by single digits is being coded, the coding sheet could contain 60 columns and 30 rows of Basemap data. If the Basemap contained a greater number of cells (either rows, columns, or both), additional coding sheets would be necessary. For instance, if a Basemap was 90 cells by 90 cells (with single digit identifiers), Figure 3 illustrates how the coding sheets would be utilized. It is suggested that tape or another fastening device be used to physically attach two or more coding forms (horizontally, but not vertically), when encoding from a basemap which contains more data cells per row than there are encoding spaces on the form. An accordion fold will permit physical handling of the resultant long strip of paper.

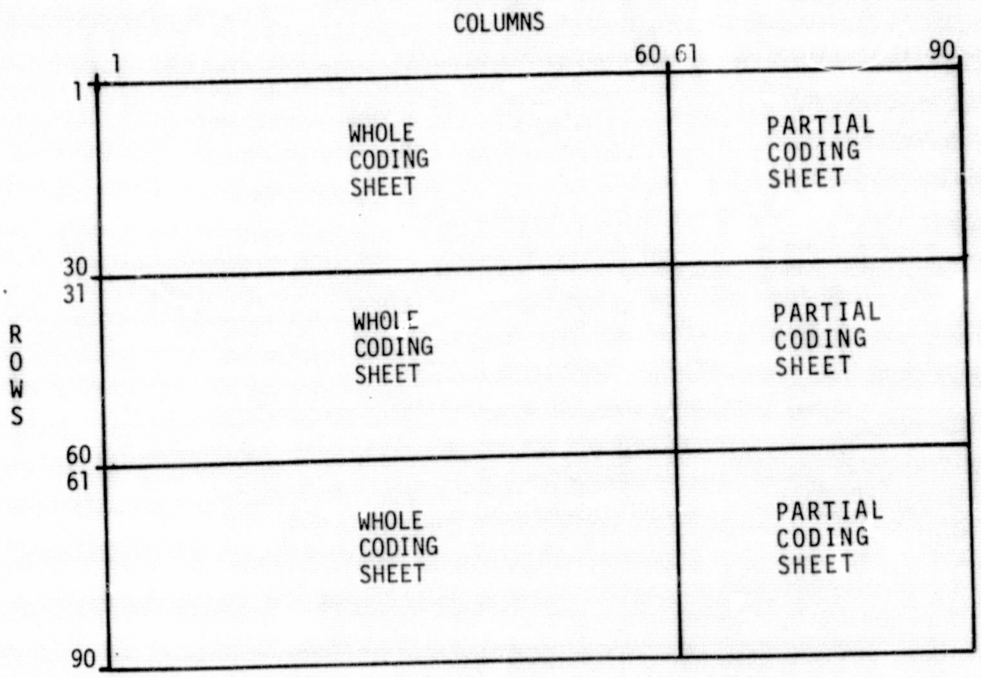


FIGURE 3

If the same 90 by 90 Basemap represented a variable identified with two-digit numeric codes, the same number of rows would fit on a coding sheet, but only 30 columns of Basemap data would fit on the 60 card columns of the coding sheet. Thus, three coding sheets would be required horizontally as well as vertically.

Encoding geographic information from a Basemap begins with the cell in the upper left corner of the rectangular Basemap matrix, or of a partitioned portion of the Basemap matrix, as shown in Figure 4, (i.e., the cell in the 1st column of the 1st row) and proceeds across the row (i.e., the cell in the 2nd column of the 1st row, the cell in the 3rd column of the 1st row, etc.) until all cells in the row of the matrix or of the partitioned portion of the matrix are coded to the extreme right edge of the matrix area or sub-area being coded. The cells in the second row are next coded in the same way, etc. As mentioned earlier, cells outside the study area but within the matrix are left blank. This tells the computer that the cells are "outside" the study area. If the Basemap is large and has been partitioned into sub-areas, as in Figure 4, when the upper left sub-area has been coded and the first coding form is finished, a second coding form is begun for the vertically adjacent sub-area. This process is continued

until the entire Basemap is coded. The coding sheet sequential order is arbitrary, but it should be uniform for a project and must be remembered, since after keypunching the cards must be sorted into Basemap row order. As noted earlier, physical attachment of coding forms into strips of thirty row forms will reduce the possibility of out-of-sequence data. This coupled with accordian folding of the long strips will still permit ease of handling.

As an example, the study area (outlined in heavy black) shown as Figure 4 has been defined and a grid overlay has been superimposed. If this data file were used to represent the variable "soils", sub-variable (1) represents "clay", sub-variable (2) represents "alluvial", and sub-variable (3) represents "rock terrace", as indicated earlier in the example of classifying the variables.

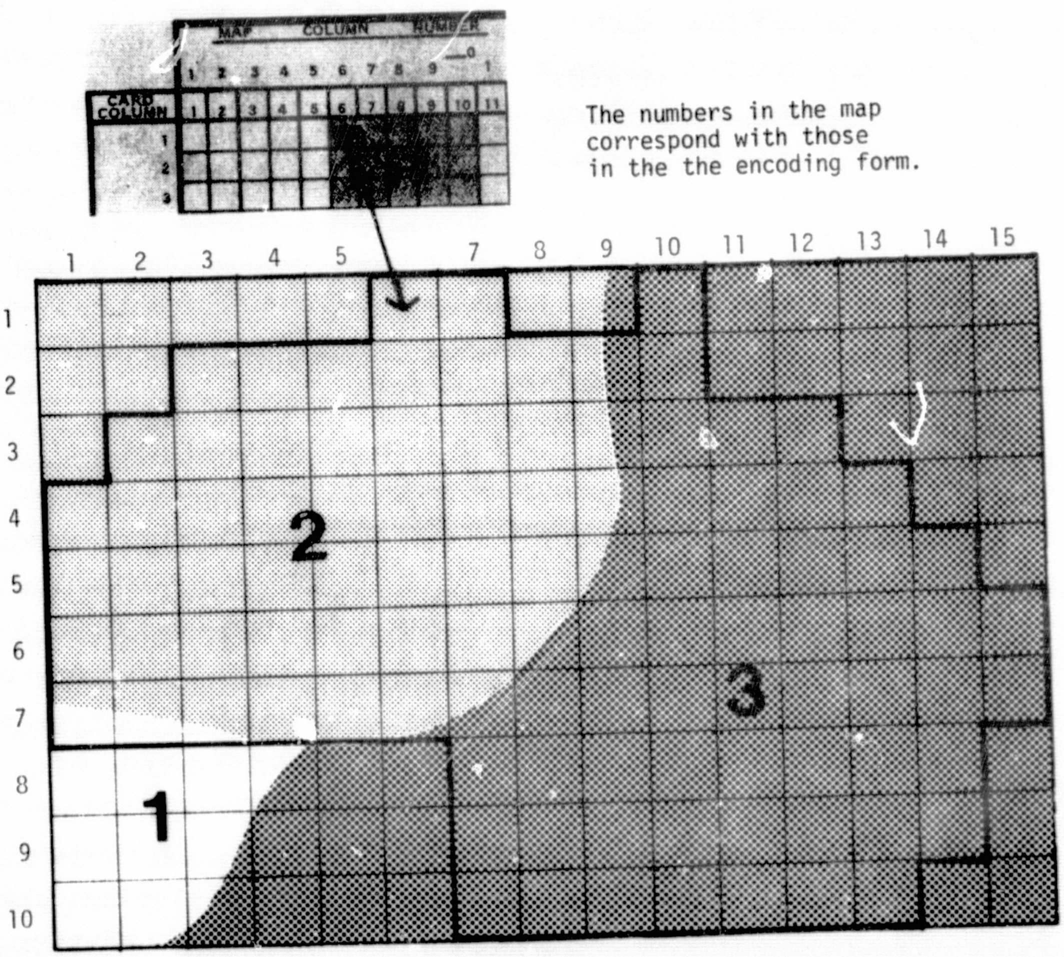
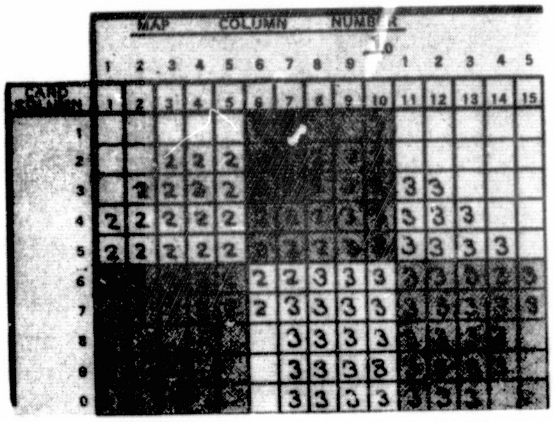
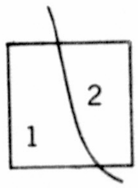


FIGURE 4

Using the single digit GRID encoding form, the grid cell rows can be encoded as shown in Figure 5. Note that non-study cells in the first row are left blank. Note that in (2,9) (i.e., row 2, column 9) where the cell contains two soil types, the soil type representing the greatest area within the cell has been chosen as that soil type most representative of the entire cell. When an even split between two sub-variables exists in a cell, enter the code of the variable on the right (rightmost) or the code of the variable on the bottom (lowermost) of the cell. See the example -





2 would be used as the sub-variable if only primary characteristics are used.

FIGURE 5

In some cases, coding just the dominant characteristic may be inadequate. In other words, one or more sub-dominant characteristics (secondary, tertiary, etc.) may be desirable to retain. The same procedure is followed, only the coding form may be modified to incorporate a minor change which allows for this. Figure 6 illustrates one method regarding the first two rows of the sample Basemap.

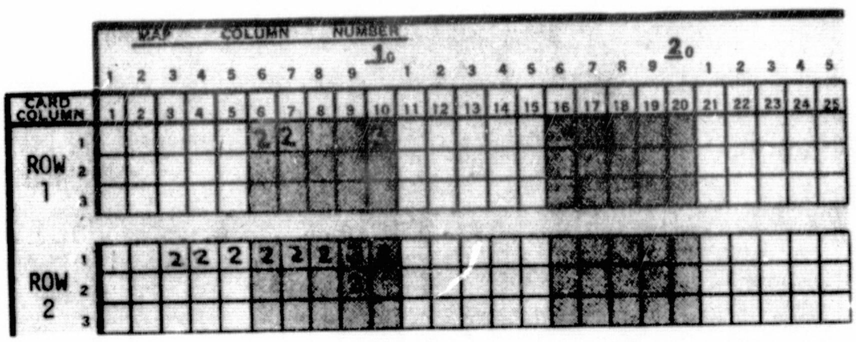


FIGURE 6

An alternative method utilizes separate sets of forms to encode secondary and teriary characteristics. With this method, data entry similar to that shown in figure 5 would be performed, except the sub-dominate information would be recorded.

While both of the presented methods for encoding sub-dominant information are feasible for use in the recording process, they do increase processing problems during the keypunching operation. Unless extreme care is exercised, it is very easy to mix cards containing primary, secondary, and tertiary characteristics into a single, ill-arranged data deck. Since primary, secondary, etc. data must be entered into separate data bases, the best method of encoding data is that one which will help avoid mixed information.

Figure 7 illustrates such a method. Notice the use of the "card number" portion of the coding form. Card columns 75 and 76 are used to record the coding form sheet (or page) number. Card columns 77 and 78 contain a map row number related to that encoding form sheet, i.e., the tenth map row encoded on that sheet would have a 10 recorded in these two columns. That tenth row might actually be the seventy-fifth map row but only the tenth row recorded on that particular form. Card column 79 is used to denote the number of the card horizontally across the map row. Recalling the discussion with respect to Figure 3, information encoded on the first portion of a coding strip would have a 1 placed in column 79, information encoded on the second portion of a coding strip would be so designated by a 2 placed in column 79, etc. Card column 80 contains a digit to designate the primary (1), secondary (2), etc. dominance of the encoded characteristic. This coded use of card columns 75 through 80 will permit computational separation and correct sequencing of the data cards prior to creation of a given data base.

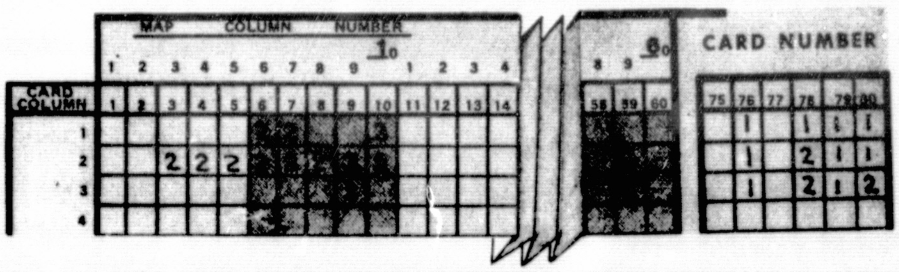
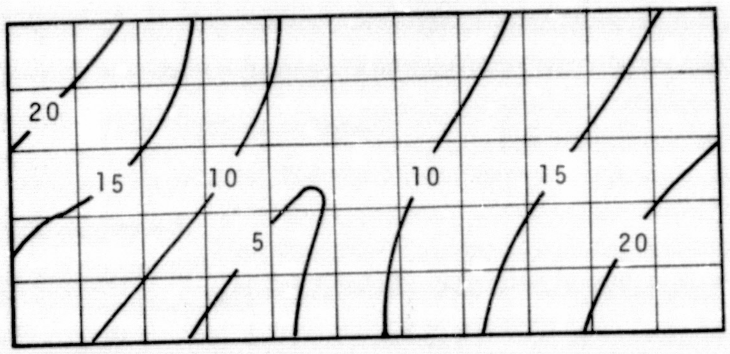


FIGURE 7

Another procedure to be noted when encoding variables involves the representation of contour information. Data encoded from topographic contours, rainfall isolines, or other contour type information must be interpolated for each grid cell. The standard procedure for encoding is to estimate the data value at the centroid (center) of the cell. Figure 8 shows a hypothetical topographic contour map and the interpolated coding of the first row of information. Note that a two-digit coding form has been used for data representation.



HYPOTHETICAL CONTOUR MAP

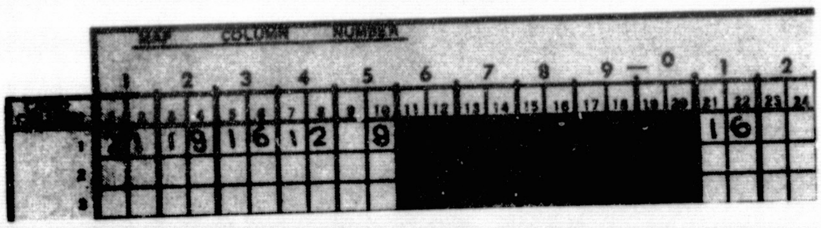
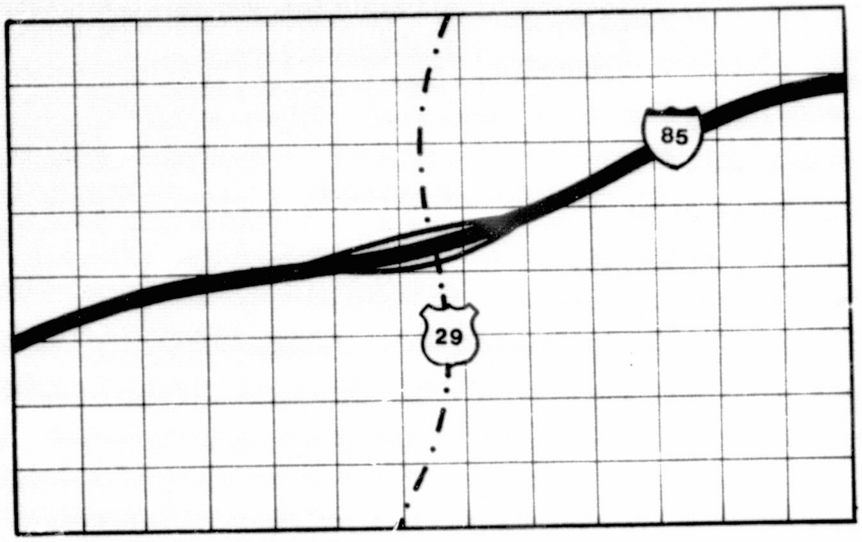


FIGURE 8

Data for encoding may also be of the line or point variety. River basins, flood plains, major highway networks, etc. are examples of line data. Point data includes highway interchanges, airports, historical monuments, and similar points. Generally, both line and point data can be viewed as binary in nature - the variable exists in a given cell or it does not exist. Figure 9 illustrates an imaginary set of highways and their intersection.



HIGHWAY INTERSECTION

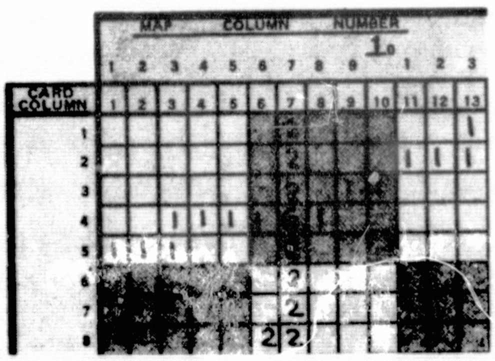


FIGURE 9

In Figure 9 the heavy line represents a segment of interstate highway while the dashed line depicts a state road. In the segment of the coded form, the codes utilized have been taken from the following set of single digit functional highway classification codes:

Variable	Code
Arterial	1
Collector	2
Local Roads and Streets	3

The digit 6 has been used in this example to represent a connected intersection of an arterial and a collector road. A multi-digit code could be utilized which presented the classification and the road number as 1085 would mean arterial, route 85 or 2280 could represent collector, route 280.

Figure 9 can also be used to illustrate the capture of point data. On the map segment (Figure 9), the interstate exchange would be of a point data type. The digit 6 at the intersection of row 4 and column 7 is a possible example. Should a data base be constructed containing only information on interstate highway interchanges, a digit 1 might be encoded into those cells in which an interchange is located (as a 1 in (4,7) in Figure 9).

KEYPUNCHING

The encoding format must be consistent to aid personnel performing the keypunching task and also to match the expectations of the computer programs which create and use the resulting data base. The same format must be used for all data encoded for a given variable. Figure 10 depicts several typical, feasible formats which are acceptable to the computer programs.

Number of Digits	Format
1 (such as the "1-6" soil types presented earlier)	(60F1.0)
2	(30F2.0)
3	(20F3.0)
4	(15F4.0)
5	(12F5.0)
6	(10F6.0)

FIGURE 10

As previously mentioned and illustrated, only the first 60 card column locations are normally used to numerically represent data. Usually, 14 of the remaining 20 columns are reserved for an identification sequence. An example of an identification sequence is shown in Figure 11.

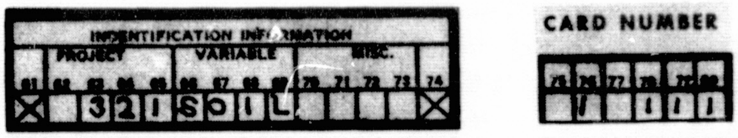


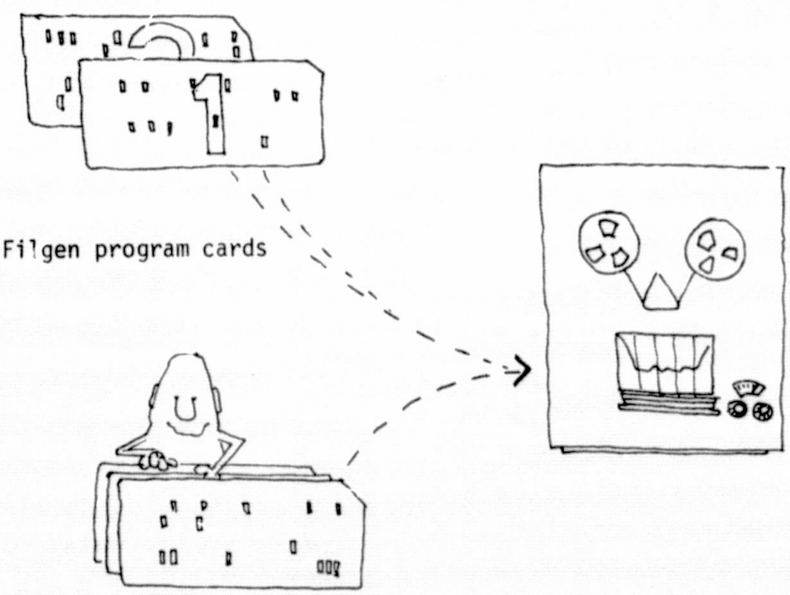
FIGURE 11

It is always wise to include a project identification number, the name of the variable being coded, and a card number which identifies the coding form page number, the map row number within that page, the number of the card horizontally across the map row, and the dominance designator (1,2,3,etc.). The detailed structure of the card number was described earlier. While the identification sequence is not monitored by the computer programs, it is very useful in assuring the data cards are properly sequenced prior to submission for the creation of a data base. Additionally, this identification procedure is useful to the determination of the contents of a box of old cards - sometimes it is prudent to retain a card deck for an indefinite period and to truly know what that deck contains.

Single Variable File Generation

INTRODUCTION

With the geographic data variables coded and keypunched, the next step is to generate a computerized data file. This file generation is accomplished by a computer program called FILGEN. This program is strictly storage oriented. No data manipulation can be accomplished by this program alone; it must be used in conjunction with other programs with manipulative capabilities for specific tasks. Two data description cards are used to identify the format of the keypunched data for submission to the FILGEN program. Once one or more single variable data files have been generated with this program, they are stored within the computer system (as a number of single variable data files, or through merging, as one or more multi-variable data files) for recall and use by any of the various manipulative programs (GRID, SEARCH, etc.). Because of the storage aspect of such file generations, a FILGEN program may, or may not, be submitted simulataneously with a run whose purpose is data manipulation.



Filgen program cards

Other manipulation program

FILGEN DATA SPECIFICATIONS

The structures of the data description cards are as follows:

1. CARD NUMBER ONE (Required)

   Three specifications are made on this card:

   a. ROWS - the number of rows comprising the input matrix (i.e., the data grid used to overlay the "Basemap" [the number of rows in the map]).

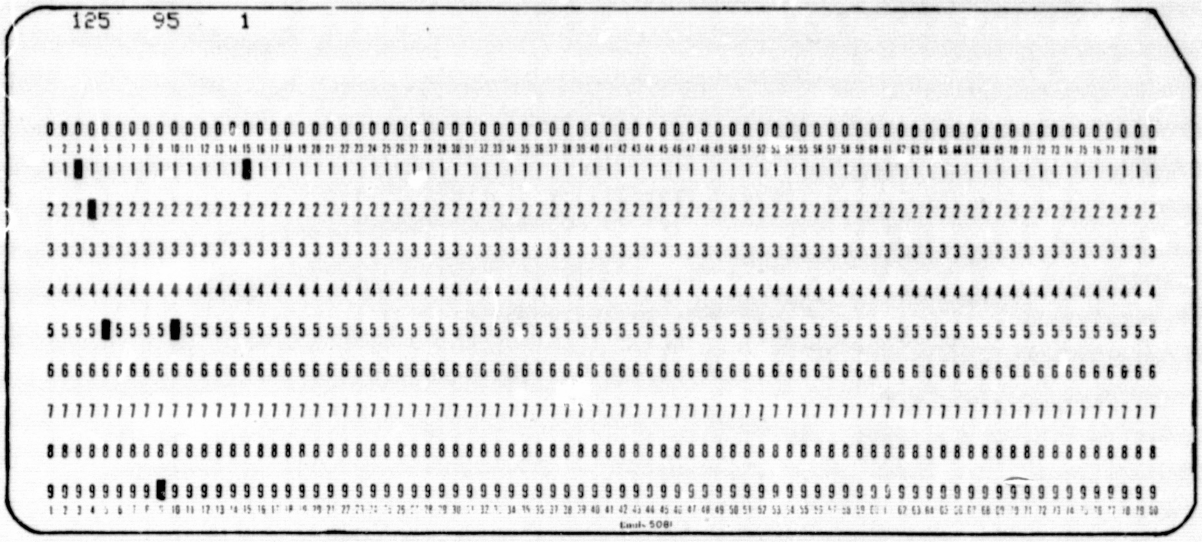
   b. COLUMNS - the number of columns comprising the input matrix (the number of columns in the map).

   c. PRINT/NO PRINT - a printout option, useful for editing input data (usually in conjunction with a grid map). The input data is printed row by row (10 columns per line).

The input format is as follows (all entries must be right justified):

<table>
<tr><th>Card Column Location</th><th>Data</th><th>Example</th></tr>
<tr><td>Columns 1-5</td><td>Number of rows</td><td><table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td></td><td></td><td>1</td><td>2</td><td>5</td></tr></table>A map grid with 125 rows is indicated as shown</td></tr>
<tr><td>Columns 6-10</td><td>Number of columns</td><td><table><tr><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td></td><td></td><td></td><td>9</td><td>5</td></tr></table>A map grid with 95 columns is indicated as shown</td></tr>
<tr><td>Columns 11-15</td><td>"0"-column 15, print desired (if left blank, default is to print)</td><td><table><tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr><tr><td></td><td></td><td></td><td></td><td>1</td></tr></table></td></tr>
<tr><td></td><td>"1"-column 15, no print desired</td><td>If no print is desired, a "one" must be indicated as shown above.</td></tr>
</table>

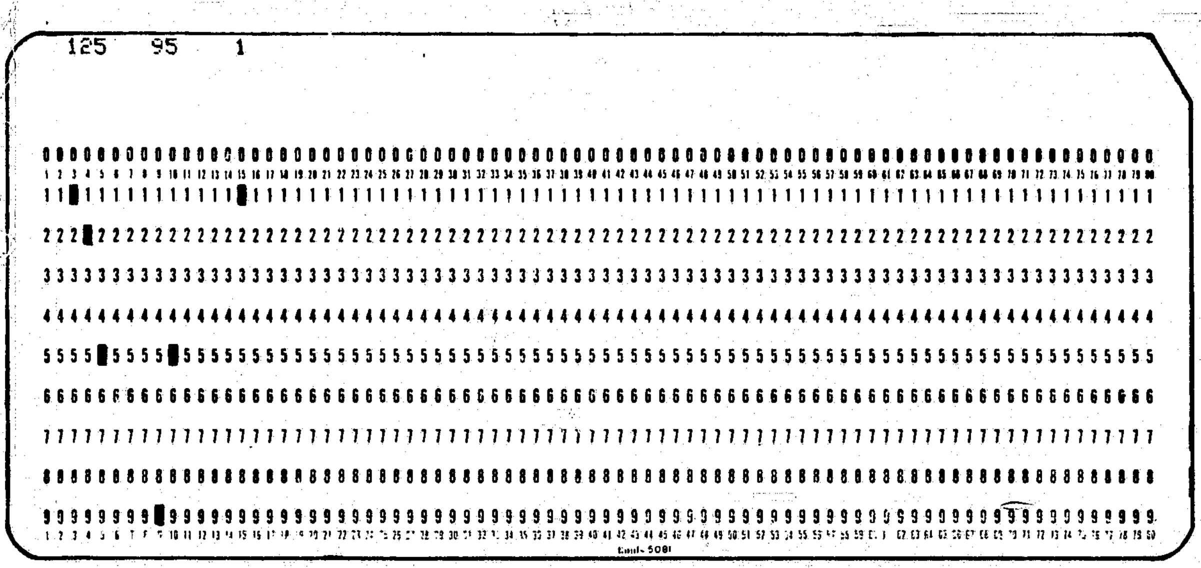
If a single variable geographic data file was being created for an area overlaid by a grid with 125 rows and 95 columns, as in the above example, and no print was desired, card number one would be keypunched as follows:



2. CARD NUMBER TWO (Required)

One specification is made on this card: the format of the keypunched input data. Since card number one specifies the number of rows and the number of columns of the input map matrix, the FILGEN program does not compute it. Since input data is read into the computer (to create a single variable file) row by row, and since the number of cells per row is known, all that is necessary to enable FILGEN to accurately identify and store the input data is the specifications regarding each piece of data (i.e., the number of digits, whether representative codes or actual data, which represent each grid cell). In other words, all card two needs to do is indicate how many fields of information (each field representing one grid cell) are contained on a card, and how many digits are used to represent each field. An "F" format is used, according to normal FORTRAN notation, as follows:

If a single variable geographic data file was being created for an area overlaid by a grid with 125 rows and 95 columns, as in the above example, and no print was desired, card number one would be keypunched as follows:



2. CARD NUMBER TWO (Required)

One specification is made on this card: the format of the keypunched input data. Since card number one specifies the number of rows and the number of columns of the input map matrix, the FILGEN program does not compute it. Since input data is read into the computer (to create a single variable file) row by row, and since the number of cells per row is known, all that is necessary to enable FILGEN to accurately identify and store the input data is the specifications regarding each piece of data (i.e., the number of digits, whether representative codes or actual data, which represent each grid cell). In other words, all card two needs to do is indicate how many fields of information (each field representing one grid cell) are contained on a card, and how many digits are used to represent each field. An "F" format is used, according to normal FORTRAN notation, as follows:

("n"F"w"."d")

n = number of fields on each card
w = number of digits used for each field of information (field width)
d = number of digits to the right of the decimal point

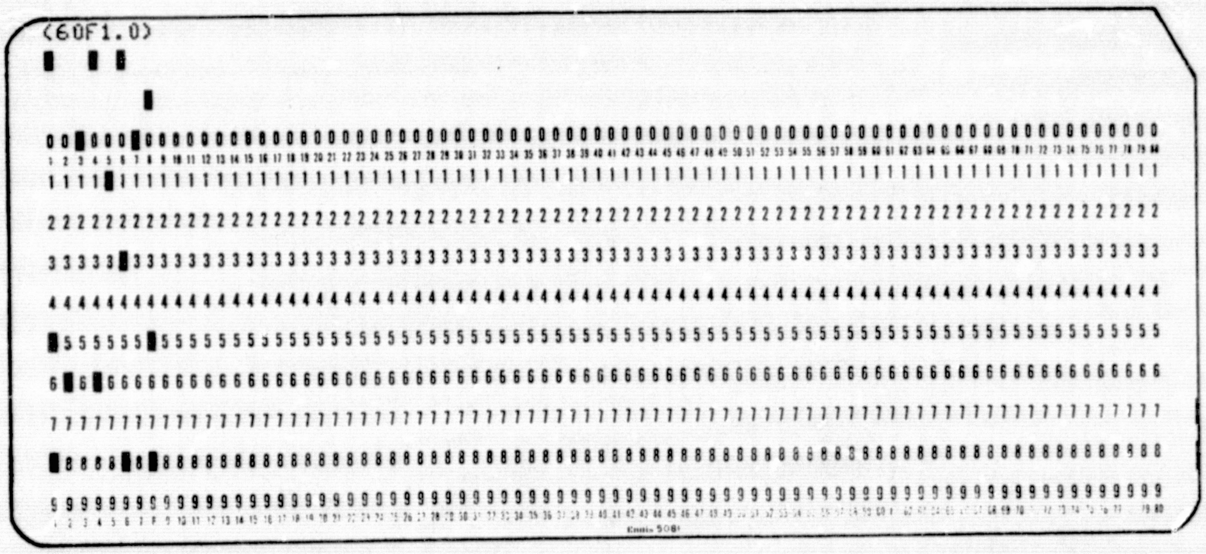
The card format is as follows:

Card Column Location	Data	Example
Columns 1-8	Format	See below

1	2	3	4	5	6	7	8
(	6	0	F	1	.	0	)

60 fields (data cells) per card, each represented by 1 digit would be indicated as shown

If 60 grid cell fields were punched on each card, each requiring one digit per grid cell, with no decimal point punched, and no digits to the right of any assumed decimal, card number two would be keypunched as follows:



Similarly, if 30 grid cell fields were punched on each card, each requiring two digits per grid cell, with no decimal point punched, and no digits to the right of an assumed decimal, the format would be indicated by (30F2.0).

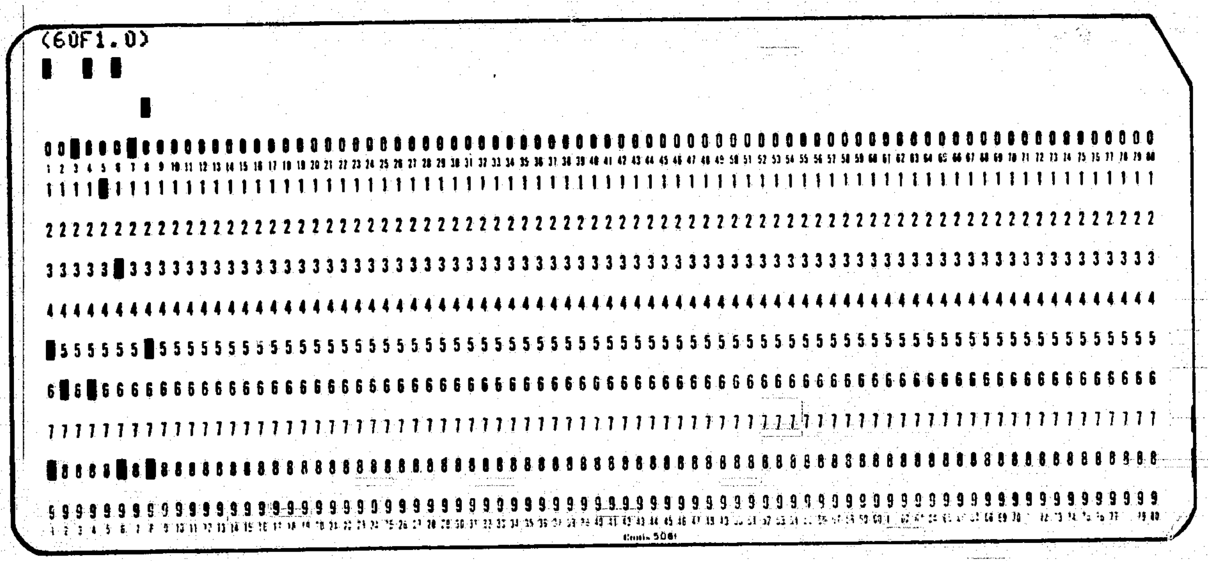
("n"F"w"."d")

n = number of fields on each card
w = number of digits used for each field of information (field width)
d = number of digits to the right of the decimal point

The card format is as follows:

Card Column Location	Data	Example
Columns 1-8	Format	1 2 3 4 5 6 7 8 (6 0 F 1 . 0) 60 fields (data cells) per card, each represented by 1 digit would be indicated as shown

If 60 grid cell fields were punched on each card, each requiring one digit per grid cell, with no decimal point punched, and no digits to the right of any assumed decimal, card number two would be keypunched as follows:

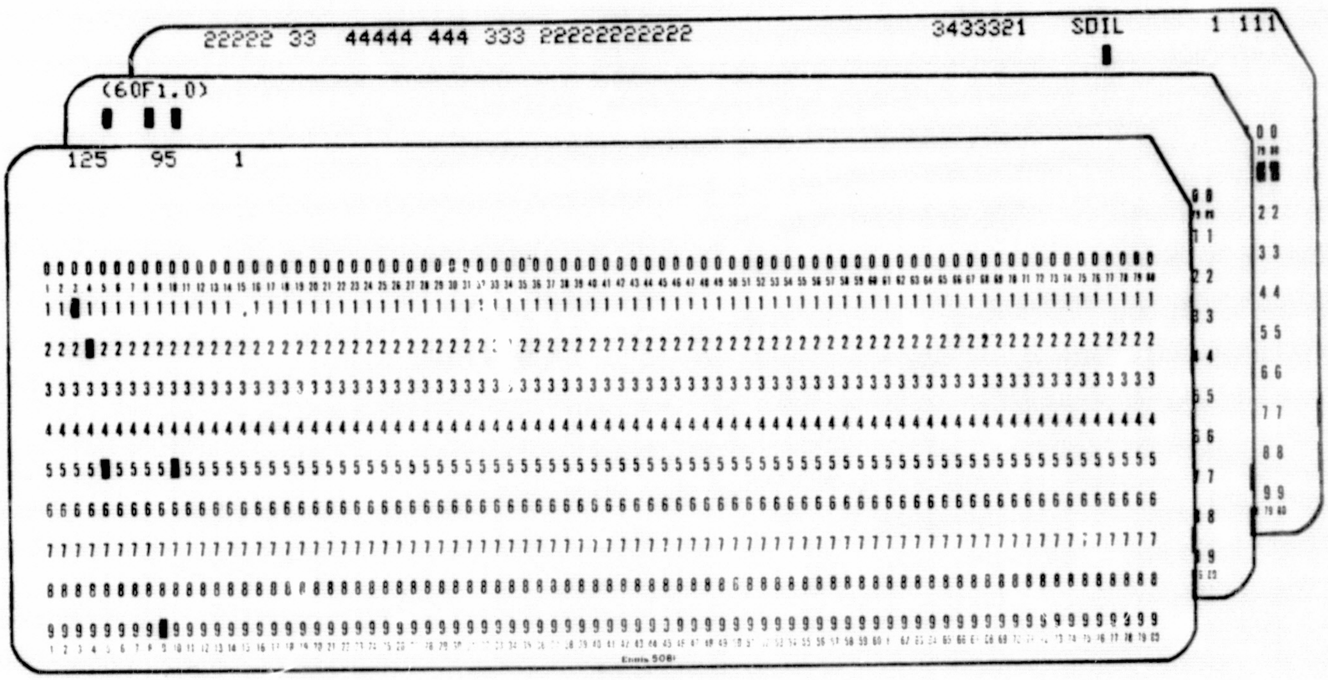


Similarly, if 30 grid cell fields were punched on each card, each requiring two digits per grid cell, with no decimal point punched, and no digits to the right of an assumed decimal, the format would be indicated by (30F2.0).

Different multiples and fractions of data representations are usable, also. For instance, if 15 topographic elevation grid cell fields were punched on each card, each requiring four digits, the rightmost digit in tenths of meters, with no decimal punched (but one assumed between the third and fourth digit), the format would be indicated by (15F4.1).

EXAMPLE FILGEN DATA SUBMISSION

The keypunched input data, prepared as described in the section of the manual dealing with data encoding, would be located subsequent to the two data description, or parameter, cards. The total FILGEN data submission would appear as follows (note, for example brevity, only one of many encoded data cards is shown):



The sample data cards shown above will not in themselves cause a single variable data file to be created. These sample data cards are data to the FILGEN program. The program causes the creation of the data file. A separate manual, entitled "ARIS System Users Manual", illustrates the steps necessary to cause execution of the FILGEN program (and the other ARIS geographic programs).

Appendix A

PROCEDURE FOR LOCATING 10 km UTM GRID ON ALABAMA COUNTY GENERAL HIGHWAY MAPS*

Each county highway map has a geographic grid of degrees and tens of minutes in both longitude and latitude in the margins and within the map as intersection crosses. These will be used to locate the Universal Transverse Mercator (UTM) grid at 10 km intervals. Since the maps used may have stretched or shrunk in height and/or width, interpolation should be done between the 10 min intersections when possible. A table of UTM coordinates of 10 min intersections is required and is included as Appendix A. In Alabama, all eastings are referred to a false easting of 500 000 m at 87°W longitude (Central Meridian, CM). Material for this table was supplied by the Department of the Interior.

The interpolation procedure is best described by use of an example. The Macon County map of 1967 is chosen (Surveying and Mapping Division, 1967). The southernmost latitude defined on this map is 32°20'. The easternmost longitude defined is 85°40'. Examination of the map will reveal a small cross at the intersections of these coordinates. Other crosses occur at other intersections at 10' intervals. A light, sharp pencil line should be drawn connecting these crosses along the line of 32°20' latitude. The eastings of the two crosses are read from the table in Appendix A: at 32°20', the easting for 1°20' (the distance 85°40' is east of 87°0') is 625 490.29 m and the easting for 1°30' (the distance 85°30' is east of 87°0') is 641 178.03 m. The two crosses are therefore 15 687.74 m apart (641 178.03 minus 625 490.29). Careful measurement directly on the map shows that the physical distance between the crosses on the sample available is 24.74 cm. This measurement should be repeated for the specific map to be marked because the sample used in this example was old paper. The locations of exact 10 km marks on the 32°20' latitude line are determined by interpolation: for the 630 000 line,

$$\frac{630\ 000.00 - 625\ 490.29}{15\ 687.74} \quad 24.74 \text{ cm} =$$

---

*NASA Technical Memorandum TM X-64953 by Charles T.N. Paluden, dated August 7, 1975.

$$\frac{4509.71}{15\ 687.74} \quad 24.74\ \text{cm} = 7.11\ \text{cm}$$

east of the 85°40' cross; for the 640 000 line,

$$\frac{640\ 000.00 - 625\ 490.29}{15\ 687.74} \quad 24.74\ \text{cm} =$$

$$\frac{14\ 509.71}{15\ 687.74} \quad 24.74\ \text{cm} = 22.88\ \text{cm}$$

east of the 85°40' cross. A sharp pencil should be used to put temporary tick marks on the 32°20' latitude line measured eastward from the 85°40' longitude cross at 7.11 cm and 22.88 cm.

At this point it is interesting to note that these marks are 0.1577 m apart. Since they correspond to a real distance of 10 000 m, a scale of 63 412 is indicated for the particular paper copy of the map chosen. This represents a shrinkage of almost 0.1 percent. Continuing to the west, interpolations are made between the crossmarks for 85°50' (easting from Appendix A of 609 803.00 m) and 85°40'(easting of 625 490.24 m) for the 610 000 and 620 000 grid marks, and between 86°00' (easting of 594 116.11 m) and 85°50' for the 600 000 grid mark.

The northernmost latitude defined on the Macon County map is 32°30'. A series of interpolations is made along the 32°30' latitude line, and light pencil ticks are placed at the 600 000, 610 000, 620 000, 630 000, and 640 000 grid positions.

An accurate straight edge and a fine tip pen with India ink can now be used to connect the pencil ticks (and extension to the margins) for the five vertical lines. A pen size of "000", or approximately 0.1 mm, of the Koh-i-noor, Staedter Mars, or similar type is recommended. The pen should be compatible with the ink and the ink should be compatible with the map material.

The northings must be determined next. These should be marked in pencil along the easternmost and westernmost meridians defined on the map; in the case of the Macon County map these meridians are 85°30' and 86°00'. Since the Macon County map has only two lines of latitude defined (32°20' and 32°30'), these must be used for all northing interpolations. From the tables which follow, the northings for the intersections are:

32°20',85°30'(1°30'E of Central Meridian)3 578 183.69

32°30',85°30'(1°30'E of Central Meridian)3 596 660.77

32°30',86°00'(1°00'E of Central Meridian)3 596 110.18

32°20',86°00'(1°00'E of Central Meridian)3 577 634.60

As before, careful measurements on the specific map to be marked should be made between the crossmarks - this time in the north-south direction. Locations of the UTM grid ticks for 3 570 000, 3 580 000, 3 590 000, and 3 600 000 lines should be placed on the easternmost (85°30') and westernmost (86°00') meridians. The tick marks should then be connected with inked lines extending to the margins.

The resulting 10 km grid should be labeled in all four margins. It is customary to deemphasize some of the digits by use of smaller case numerals. The eastings in this example would be labeled $^{6}00^{000\text{m}}$ E, $^{6}10^{000\text{m}}$ E, etc., and the northings would be $^{35}70^{000\text{m}}$ N, $^{35}80^{000\text{m}}$ N, etc. The symbol "m" for meters should be included to avoid confusion with the 30 000 ft state coordinate system.

This procedure has been written for the specific case of Alabama's General County Highway Maps. It could probably be adapted to other states and other maps.

Should the procedure outlined in this appendix be found unworkable by the user, assistance can be obtained by contacting the State Planning Division of the Alabama Development Office. Computer-aided conversions from specific latitude/longitude coordinates to UTM can be obtained directly.
Care must be exercised when specifying the UTM coordinate for a given basemap. The Alabama Base Point (UTM easting of 350,000 meters and northing of 3,880,000 meters) would also be the origin of a basemap containing the extreme northwest portion of the State. However, the UTM coordinates of the first cell in that map (using a one quarter kilometer grid - 500 meters by 500 meters) have an easting of 350,000 meters but a northing of 3,879,500 meters - 500 meters south of the Alabama Base Point. Basemaps should be oriented to cause their origins to be at or on 1000 meter increments east and/or south of the Alabama Base Point. Thus, the UTM coordinates of such basemaps will have easting values at or on 1000 meters east of the Alabama Base Point and northing values which are on one of the 500 meter increments south of the Alabama Base POint. This deviation is caused by the standard UTM convention of identifying the Southwest corner of grid cells.

NATIONAL TRANSVERSE MERCATOR

GRID TABLES

FOR LATITUDES

30.0.0-35. 0.0 DEGREES

CLARKE 1866 SPHEROID (METERS)

COORDINATES FOR 10.0-MINUTE INTERSECTIONS

LATITUDE 30. 0. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3318605.33
0.10. 0.	483925.05	516074.95	3318617.02
0.20. 0.	467850.03	532149.97	3318652.09
0.[illegible] 0.	451774.88	548225.12	3318710.54
0.40. 0.	435699.51	564300.49	3318792.37
0.50. 0.	419623.88	580376.12	3318897.59
1. 0. 0.	403547.90	596452.10	3319026.20
1.10. 0.	387471.51	612528.49	3319178.21
1.20. 0.	371394.64	628605.36	3319353.61
1.30. 0.	355317.23	644682.77	3319552.41
1.40. 0.	339239.19	660760.81	3319774.62
1.50. 0.	323160.47	676839.53	3320020.25
2. 0. 0.	307081.00	692919.00	3320289.29
2.10. 0.	291000.70	708999.30	3320581.77
2.20. 0.	274919.52	725080.48	3320897.69
2.30. 0.	258837.37	741162.63	3321237.06
2.40. 0.	242754.20	757245.80	3321599.88
2.50. 0.	226669.93	773330.07	3321986.18
3. 0. 0.	210584.50	789415.50	3322395.95

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING

LATITUDE

30.10. 0.

0. 0. 0.	500000.00	500000.00	3337072.91
0.10. 0.	483951.98	516048.02	3337084.64
0.20. 0.	467903.89	532096.11	3337119.83
0.30. 0.	451855.66	548144.34	3337178.48
0.40. 0.	435807.23	564192.77	3337260.59
0.50. 0.	419758.53	580241.47	3337366.16
1. 0. 0.	403709.50	596290.50	3337495.20
1.10. 0.	387660.05	612339.95	3337647.72
1.20. 0.	371610.13	628389.87	3337823.70
1.30. 0.	355559.67	644440.33	3338023.17
1.40. 0.	339508.60	660491.40	3338246.13
1.50. 0.	323456.86	676543.14	3338492.57
2. 0. 0.	307404.36	692595.64	3338762.52
2.10. 0.	291351.06	708648.94	3339055.98
2.20. 0.	275296.87	724703.13	3339372.96
2.30. 0.	259241.74	740758.26	3339713.46
2.40. 0.	243185.59	756814.41	3340077.50
2.50. 0.	227128.36	772871.64	3340465.08
3. 0. 0.	211069.98	788930.02	3340876.23

LATITUDE

30.20. 0.

0. 0. 0.	500000.00	500000.00	3355540.98
0.10. 0.	483979.04	516020.96	3355552.75
0.20. 0.	467958.02	532041.98	3355588.05
0.30. 0.	451936.86	548063.14	3355646.89
0.40. 0.	435915.50	564084.50	3355729.27
0.50. 0.	419893.87	580106.13	3355835.20
1. 0. 0.	403871.91	596128.09	3355964.66
1.10. 0.	387849.54	612150.46	3356117.68
1.20. 0.	371826.71	628173.29	3356294.25
1.30. 0.	355803.34	644196.66	3356494.37
1.40. 0.	339779.37	660220.63	3356718.07
1.50. 0.	323754.73	676245.27	3356965.33
2. 0. 0.	307729.36	692270.64	3357236.17
2.10. 0.	291703.18	708296.82	3357530.60
2.20. 0.	275676.13	724323.87	3357848.62
2.30. 0.	259648.15	740351.85	3358190.24
2.40. 0.	243619.16	756380.84	3358555.48
2.50. 0.	227589.10	772410.90	3358944.35
3. 0. 0.	211557.90	788442.10	3359356.85

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING

LATITUDE

30.30. 0.

0. 0. 0.	500000.00	500000.00	3374009.52
0.10. 0.	484006.24	515993.76	3374021.32
0.20. 0.	468012.41	531987.59	3374056.74
0.30. 0.	452018.46	547981.54	3374115.78
0.40. 0.	436024.30	563975.70	3374198.43
0.50. 0.	420029.88	579970.12	3374304.70
1. 0. 0.	404035.13	595964.87	3374434.58
1.10. 0.	388039.98	611960.02	3374588.10
1.20. 0.	372044.37	627955.63	3374765.24
1.30. 0.	356048.23	643951.77	3374966.02
1.40. 0.	340051.49	659948.51	3375190.44
1.50. 0.	324054.10	675945.90	3375438.51
2. 0. 0.	308055.98	691944.02	3375710.23
2.10. 0.	292057.06	707942.94	3376005.62
2.20. 0.	276057.28	723942.72	3376324.68
2.30. 0.	260056.58	739943.42	3376667.42
2.40. 0.	244054.89	755945.11	3377033.85
2.50. 0.	228052.14	771947.86	3377425.98
3. 0. 0.	212048.27	787951.73	3377837.82

LATITUDE

30.40. 0.

0. 0. 0.	500000.00	500000.00	3392478.54
0.10. 0.	484033.57	515966.43	3392490.38
0.20. 0.	468067.08	531932.92	3392525.91
0.30. 0.	452100.46	547899.54	3392585.14
0.40. 0.	436133.65	563866.35	3392668.05
0.50. 0.	420166.57	579833.43	3392774.66
1. 0. 0.	404199.16	595800.84	3392904.97
1.10. 0.	388231.37	611768.63	3393058.98
1.20. 0.	372263.11	627736.89	3393236.69
1.30. 0.	356294.34	643705.66	3393438.12
1.40. 0.	340324.97	659675.03	3393663.26
1.50. 0.	324354.96	675645.04	3393912.12
2. 0. 0.	308384.22	691615.78	3394184.72
2.10. 0.	292412.70	707587.30	3394481.05
2.20. 0.	276440.33	723559.67	3394801.14
2.30. 0.	260467.05	739532.95	3395144.98
2.40. 0.	244492.79	755507.21	3395512.58
2.50. 0.	228517.49	771482.51	3395903.97
3. 0. 0.	212541.07	787458.93	3396319.14

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 30.50. 0.		
0. 0. 0.	500000.00	500000.00	3410948.03
0.10. 0.	484061.04	515938.96	3410959.92
0.20. 0.	468122.02	531877.98	3410995.56
0.30. 0.	452182.88	547817.12	3411054.97
0.40. 0.	436243.53	563756.47	3411138.15
0.50. 0.	420303.93	579696.07	3411245.10
1. 0. 0.	404364.01	595635.99	3411375.82
1.10. 0.	388423.70	611576.30	3411530.32
1.20. 0.	372482.94	627517.06	3411708.59
1.30. 0.	356541.66	643458.34	3411910.66
1.40. 0.	340599.80	659400.20	3412136.51
1.50. 0.	324657.30	675342.70	3412386.17
2. 0. 0.	308714.09	691285.91	3412659.63
2.10. 0.	292770.10	707229.90	3412956.90
2.20. 0.	276825.28	723174.72	3413278.00
2.30. 0.	260879.55	739120.45	3413622.93
2.40. 0.	244932.85	755067.15	3413991.70
2.50. 0.	228985.13	771014.87	3414384.32
3. 0. 0.	213036.31	786963.69	3414800.81
	LATITUDE 31. 0. 0.		
0. 0. 0.	500000.00	500000.00	3429418.01
0.10. 0.	484088.65	515911.35	3429429.93
0.20. 0.	468177.23	531822.77	3429465.69
0.30. 0.	452265.69	547734.31	3429525.29
0.40. 0.	436353.96	563646.04	3429608.72
0.50. 0.	420441.97	579558.03	3429716.01
1. 0. 0.	404529.67	595470.33	3429847.14
1.10. 0.	388616.98	611383.02	3430002.12
1.20. 0.	372703.84	627296.16	3430180.95
1.30. 0.	356790.20	643209.80	3430383.65
1.40. 0.	340875.98	659124.02	3430610.21
1.50. 0.	324961.13	675038.87	3430860.64
2. 0. 0.	309045.57	690954.43	3431134.96
2.10. 0.	293129.25	706870.75	3431433.16
2.20. 0.	277212.11	722787.89	3431755.26
2.30. 0.	261294.07	738705.93	3432101.27
2.40. 0.	245375.08	754624.92	3432471.19
2.50. 0.	229455.06	770544.94	3432865.04
3. 0. 0.	213533.97	786466.03	3433282.83

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 31.10. 0.		
0. 0. 0.	500000.00	500000.00	3447888.47
0.10. 0.	484116.39	515883.61	3447900.43
0.20. 0.	468232.71	531767.29	3447936.30
0.30. 0.	452348.91	547651.09	3447996.08
0.40. 0.	436464.92	563535.08	3448079.77
0.50. 0.	420580.68	579419.32	3448187.39
1. 0. 0.	404696.13	595303.87	3448318.92
1.10. 0.	388811.20	611188.80	3448474.38
1.20. 0.	372925.82	627074.18	3448653.76
1.30. 0.	357039.95	642960.05	3448857.09
1.40. 0.	341153.51	658846.49	3449084.35
1.50. 0.	325266.44	674733.56	3449335.55
2. 0. 0.	309378.67	690621.33	3449610.71
2.10. 0.	293490.16	706509.84	3449909.83
2.20. 0.	277600.82	722399.18	3450232.93
2.30. 0.	261710.61	738289.39	3450580.00
2.40. 0.	245819.45	754180.55	3450951.06
2.50. 0.	229927.29	770072.71	3451346.12
3. 0. 0.	214034.06	785965.94	3451765.20
	LATITUDE 31.20. 0.		
0. 0. 0.	500000.00	500000.00	3466359.42
0.10. 0.	484144.26	515855.74	3466371.41
0.20. 0.	468288.46	531711.54	3466407.39
0.30. 0.	452432.54	547567.46	3466467.35
0.40. 0.	436576.43	563423.57	3466551.30
0.50. 0.	420720.07	579279.93	3466659.24
1. 0. 0.	404863.40	595136.60	3466791.17
1.10. 0.	389006.36	610993.64	3466947.11
1.20. 0.	373148.88	626851.12	3467127.04
1.30. 0.	357290.91	642709.09	3467330.98
1.40. 0.	341432.38	658567.62	3467558.93
1.50. 0.	325573.22	674426.78	3467810.90
2. 0. 0.	309713.39	690286.61	3468086.89
2.10. 0.	293852.81	706147.19	3468386.92
2.20. 0.	277991.42	722008.58	3468711.00
2.30. 0.	262129.17	737870.83	3469059.12
2.40. 0.	246265.98	753734.02	3469431.31
2.50. 0.	230401.80	769598.20	3469827.58
3. 0. 0.	214536.57	785463.43	3470247.92

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 31.30. 0.		
0. 0. 0.	500000.00	500000.00	3484830.85
0.10. 0.	484172.27	515827.73	3484842.88
0.20. 0.	468344.48	531655.52	3484878.96
0.30. 0.	452516.56	547483.44	3484939.10
0.40. 0.	436688.47	563311.53	3485023.31
0.50. 0.	420860.12	579139.88	3485131.57
1. 0. 0.	405031.48	594968.52	3485263.90
1.10. 0.	389202.46	610797.54	3485420.30
1.20. 0.	373373.01	626626.99	3485600.77
1.30. 0.	357543.08	642456.92	3485805.32
1.40. 0.	341712.59	658287.41	3486033.95
1.50. 0.	325881.49	674118.51	3486286.68
2. 0. 0.	310049.71	689950.29	3486563.50
2.10. 0.	294217.21	705782.79	3486864.43
2.20. 0.	278383.90	721616.10	3487189.48
2.30. 0.	262549.74	737450.26	3487538.64
2.40. 0.	246714.66	753285.34	3487911.95
2.50. 0.	230878.59	769121.41	3488309.40
3. 0. 0.	215041.49	784958.51	3488731.00
	LATITUDE 31.40. 0.		
0. 0. 0.	500000.00	500000.00	3503302.77
0.10. 0.	484200.41	515799.59	3503314.83
0.20. 0.	468400.76	531599.24	3503351.02
0.30. 0.	452600.99	547399.01	3503411.34
0.40. 0.	436801.04	563198.96	3503495.79
0.50. 0.	421000.85	578999.15	3503604.38
1. 0. 0.	405200.36	594799.64	3503737.10
1.10. 0.	389399.50	610600.50	3503893.96
1.20. 0.	373598.22	626401.78	3504074.96
1.30. 0.	357796.45	642203.55	3504280.12
1.40. 0.	341994.14	658005.86	3504509.43
1.50. 0.	326191.23	673808.77	3504762.90
2. 0. 0.	310387.65	689612.35	3505040.54
2.10. 0.	294583.34	705416.66	3505342.36
2.20. 0.	278778.25	721221.75	3505668.36
2.30. 0.	262972.32	737027.68	3506018.56
2.40. 0.	247165.48	752834.52	3506392.96
2.50. 0.	231357.67	768642.33	3506791.58
3. 0. 0.	215548.83	784451.17	3507214.43

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE		
	31.50. 0.		
0. 0. 0.	500000.00	500000.00	3521775.17
0.10. 0.	484228.69	515771.31	3521787.27
0.20. 0.	468457.32	531542.68	3521823.57
0.30. 0.	452685.82	547314.18	3521884.06
0.40. 0.	436914.15	563085.85	3521968.76
0.50. 0.	421142.25	578857.75	3522077.66
1. 0. 0.	405370.04	594629.96	3522210.77
1.10. 0.	389597.47	610402.53	3522368.09
1.20. 0.	373824.49	626175.51	3522549.62
1.30. 0.	358051.03	641948.97	3522755.37
1.40. 0.	342277.03	657722.97	3522985.35
1.50. 0.	326502.44	673497.56	3523239.56
2. 0. 0.	310727.19	689272.81	3523518.00
2.10. 0.	294951.22	705048.78	3523820.70
2.20. 0.	279174.48	720825.52	3524147.65
2.30. 0.	263396.91	736603.09	3524498.87
2.40. 0.	247618.44	752381.56	3524874.37
2.50. 0.	231839.01	768160.99	3525274.14
3. 0. 0.	216058.57	783941.43	3525698.22
	LATITUDE		
	32. 0. 0.		
0. 0. 0.	500000.00	500000.00	3540248.07
0.10. 0.	484257.10	515742.90	3540260.20
0.20. 0.	468514.14	531485.86	3540296.60
0.30. 0.	452771.06	547228.94	3540357.27
0.40. 0.	437027.80	562972.20	3540442.21
0.50. 0.	421284.31	578715.69	3540551.43
1. 0. 0.	405540.52	594459.48	3540684.91
1.10. 0.	389796.38	610203.62	3540842.68
1.20. 0.	374051.83	625948.17	3541024.74
1.30. 0.	358306.81	641693.19	3541231.08
1.40. 0.	342561.26	657438.74	3541461.72
1.50. 0.	326815.12	673184.88	3541716.65
2. 0. 0.	311068.33	688931.67	3541995.90
2.10. 0.	295320.84	704679.16	3542299.47
2.20. 0.	279572.58	720427.42	3542627.36
2.30. 0.	263823.50	736176.50	3542979.58
2.40. 0.	248073.53	751926.47	3543356.15
2.50. 0.	232322.63	767677.37	3543757.08
3. 0. 0.	216570.72	783429.28	3544182.37

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 32.10. 0.		
0. 0. 0.	500000.00	500000.00	3558721.45
0.10. 0.	484285.64	515714.36	3558733.62
0.20. 0.	468571.22	531428.78	3558770.13
0.30. 0.	452856.69	547143.31	3558830.97
0.40. 0.	437141.98	562858.02	3558916.15
0.50. 0.	421427.04	578572.96	3559025.67
1. 0. 0.	405711.81	594288.19	3559159.54
1.10. 0.	389996.23	610003.77	3559317.75
1.20. 0.	374280.24	625719.76	3559500.32
1.30. 0.	358563.79	641436.21	3559707.25
1.40. 0.	342846.82	657153.18	3559938.53
1.50. 0.	327129.26	672870.74	3560194.19
2. 0. 0.	311411.07	688588.93	3560474.23
2.10. 0.	295692.18	704307.82	3560778.65
2.20. 0.	279972.54	720027.46	3561107.47
2.30. 0.	264252.09	735747.91	3561460.69
2.40. 0.	248530.76	751469.24	3561838.32
2.50. 0.	232808.51	767191.49	3562240.38
3. 0. 0.	217085.27	782914.73	3562666.87
	LATITUDE 32.20. 0.		
0. 0. 0.	500000.00	500000.00	3577195.33
0.10. 0.	484314.32	515685.68	3577207.54
0.20. 0.	468628.57	531371.43	3577244.14
0.30. 0.	452942.72	547057.28	3577305.15
0.40. 0.	437256.69	562743.31	3577390.57
0.50. 0.	421570.43	578429.57	3577500.40
1. 0. 0.	405883.89	594116.11	3577634.64
1.10. 0.	390197.00	609803.00	3577793.29
1.20. 0.	374509.71	625490.29	3577976.37
1.30. 0.	358821.97	641178.03	3578183.87
1.40. 0.	343133.71	656866.29	3578415.81
1.50. 0.	327444.87	672555.13	3578672.18
2. 0. 0.	311755.41	688244.59	3578952.99
2.10. 0.	296065.26	703934.74	3579258.26
2.20. 0.	280374.37	719625.63	3579588.00
2.30. 0.	264682.68	735317.32	3579942.20
2.40. 0.	248990.12	751009.88	3580320.88
2.50. 0.	233296.66	766703.34	3580724.06
3. 0. 0.	217602.22	782397.78	3581151.74

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 32.30. 0.		
0. 0. 0.	500000.00	500000.00	3595669.71
0.10. 0.	484343.12	515656.88	3595681.94
0.20. 0.	468686.19	531313.81	3595718.65
0.30. 0.	453029.15	546970.85	3595779.83
0.40. 0.	437371.93	562628.07	3595865.48
0.50. 0.	421714.49	578285.51	3595975.61
1. 0. 0.	406056.77	593943.23	3596110.22
1.10. 0.	390398.71	609601.29	3596269.31
1.20. 0.	374740.25	625259.75	3596452.89
1.30. 0.	359081.34	640918.66	3596660.96
1.40. 0.	343421.93	656578.07	3596893.53
1.50. 0.	327761.95	672238.05	3597150.61
2. 0. 0.	312101.34	687898.66	3597432.19
2.10. 0.	296440.07	703559.93	3597738.30
2.20. 0.	280778.06	719221.94	3598068.94
2.30. 0.	265115.25	734884.75	3598424.11
2.40. 0.	249451.61	750548.39	3598803.83
2.50. 0.	233787.06	766212.94	3599208.11
3. 0. 0.	218121.55	781878.45	3599636.96
	LATITUDE 32.40. 0.		
0. 0. 0.	500000.00	500000.00	3614144.58
0.10. 0.	484372.06	515627.94	3614156.84
0.20. 0.	468744.07	531255.93	3614193.65
0.30. 0.	453115.97	546884.03	3614255.00
0.40. 0.	437487.70	562512.30	3614340.88
0.50. 0.	421859.21	578140.79	3614451.31
1. 0. 0.	406230.44	593769.56	3614586.28
1.10. 0.	390601.34	609398.66	3614745.80
1.20. 0.	374971.85	625028.15	3614929.88
1.30. 0.	359341.91	640658.09	3615138.51
1.40. 0.	343711.47	656288.53	3615371.71
1.50. 0.	328080.48	671919.52	3615629.48
2. 0. 0.	312448.87	687551.13	3615911.83
2.10. 0.	296816.60	703183.40	3616218.76
2.20. 0.	281183.60	718816.40	3616550.29
2.30. 0.	265549.82	734450.18	3616906.42
2.40. 0.	249915.21	750084.79	3617287.17
2.50. 0.	234279.72	765720.28	3617692.54
3. 0. 0.	218643.27	781356.73	3618122.55

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 32.50. 0.		
0. 0. 0.	500000.00	500000.00	3632619.94
0.10. 0.	484401.14	515598.86	3632632.24
0.20. 0.	468802.22	531197.78	3632669.15
0.30. 0.	453203.20	546796.80	3632730.66
0.40. 0.	437604.01	562395.99	3632816.77
0.50. 0.	422004.60	577995.40	3632927.49
1. 0. 0.	406404.91	593595.09	3633062.82
1.10. 0.	390804.90	609195.10	3633222.77
1.20. 0.	375204.50	624795.50	3633407.33
1.30. 0.	359603.67	640396.33	3633616.52
1.40. 0.	344002.34	655997.66	3633850.34
1.50. 0.	328400.46	671599.54	3634108.80
2. 0. 0.	312797.98	687202.02	3634391.90
2.10. 0.	297194.84	702805.16	3634699.65
2.20. 0.	281590.99	718409.01	3635032.06
2.30. 0.	265986.38	734013.62	3635389.14
2.40. 0.	250380.94	749619.06	3635770.90
2.50. 0.	234774.62	765225.38	3636177.34
3. 0. 0.	219167.38	780832.62	3636608.49
	LATITUDE 33. 0. 0.		
0. 0. 0.	500000.00	500000.00	3651095.81
0.10. 0.	484430.34	515569.66	3651108.14
0.20. 0.	468860.63	531139.37	3651145.14
0.30. 0.	453290.82	546709.18	3651206.81
0.40. 0.	437720.84	562279.16	3651293.15
0.50. 0.	422150.64	577849.36	3651404.16
1. 0. 0.	406580.17	593419.83	3651539.85
1.10. 0.	391009.38	608990.62	3651700.21
1.20. 0.	375438.22	624561.78	3651885.26
1.30. 0.	359866.61	640133.39	3652095.00
1.40. 0.	344294.53	655705.47	3652329.43
1.50. 0.	328721.90	671278.10	3652588.56
2. 0. 0.	313148.68	686851.32	3652872.41
2.10. 0.	297574.81	702425.19	3653180.96
2.20. 0.	282000.24	717999.76	3653514.24
2.30. 0.	266424.91	733575.09	3653872.26
2.40. 0.	250848.78	749151.22	3654255.02
2.50. 0.	235271.78	764728.22	3654662.53
3. 0. 0.	219693.86	780306.14	3655094.81

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 33.10. 0.		
0. 0. 0.	500000.00	500000.00	3669572.17
0.10. 0.	484459.68	515540.32	3669584.54
0.20. 0.	468919.31	531080.69	3669621.63
0.30. 0.	453378.83	546621.17	3669683.46
0.40. 0.	437838.19	562161.81	3669770.02
0.50. 0.	422297.34	577702.66	3669881.32
1. 0. 0.	406756.23	593243.77	3670017.36
1.10. 0.	391214.79	608785.21	3670178.14
1.20. 0.	375672.98	624327.02	3670363.66
1.30. 0.	360130.75	639869.25	3670573.94
1.40. 0.	344588.04	655411.96	3670808.98
1.50. 0.	329044.79	670955.21	3671068.78
2. 0. 0.	313500.96	686499.04	3671353.35
2.10. 0.	297956.49	702043.51	3671662.71
2.20. 0.	282411.33	717588.67	3671996.85
2.30. 0.	266865.43	733134.57	3672355.79
2.40. 0.	251318.73	748681.27	3672739.53
2.50. 0.	235771.17	764228.83	3673148.09
3. 0. 0.	220222.72	779777.28	3673581.48
	LATITUDE 33.20. 0.		
0. 0. 0.	500000.00	500000.00	3688049.04
0.10. 0.	484489.15	515510.85	3688061.43
0.20. 0.	468978.25	531021.75	3688098.62
0.30. 0.	453467.24	546532.76	3688160.61
0.40. 0.	437956.08	562043.92	3688247.39
0.50. 0.	422444.71	577555.29	3688358.97
1. 0. 0.	406933.07	593066.93	3688495.35
1.10. 0.	391421.12	608578.88	3688656.54
1.20. 0.	375908.80	624091.20	3688842.54
1.30. 0.	360396.07	639603.93	3689053.35
1.40. 0.	344882.86	655117.14	3689288.99
1.50. 0.	329369.13	670630.87	3689549.45
2. 0. 0.	313854.82	686145.18	3689834.74
2.10. 0.	298339.89	701660.11	3690144.88
2.20. 0.	282824.27	717175.73	3690479.87
2.30. 0.	267307.92	732692.08	3690839.72
2.40. 0.	251790.78	748209.22	3691224.44
2.50. 0.	236272.81	763727.19	3691634.03
3. 0. 0.	220753.95	779246.05	3692068.52

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 33.30. 0.		
0. 0. 0.	500000.00	500000.00	3706526.40
0.10. 0.	484518.75	515481.25	3706538.83
0.20. 0.	469037.45	530962.55	3706576.11
0.30. 0.	453556.05	546443.95	3706638.25
0.40. 0.	438074.49	561925.51	3706725.25
0.50. 0.	422592.73	577407.27	3706837.11
1. 0. 0.	407110.70	592889.30	3706973.84
1.10. 0.	391628.37	608371.63	3707135.43
1.20. 0.	376145.68	623854.32	3707321.89
1.30. 0.	360662.57	639337.43	3707533.23
1.40. 0.	345179.00	654821.00	3707769.45
1.50. 0.	329694.91	670305.09	3708030.57
2. 0. 0.	314210.26	685789.74	3708316.57
2.10. 0.	298724.99	701275.01	3708627.49
2.20. 0.	283239.04	716760.96	3708963.31
2.30. 0.	267752.38	732247.62	3709324.06
2.40. 0.	252264.94	747735.06	3709709.74
2.50. 0.	236776.68	763223.32	3710120.36
3. 0. 0.	221287.54	778712.46	3710555.93
	LATITUDE 33.40. 0.		
0. 0. 0.	500000.00	500000.00	3725004.27
0.10. 0.	484548.48	515451.52	3725016.73
0.20. 0.	469096.92	530903.08	3725054.11
0.30. 0.	453645.25	546354.75	3725116.40
0.40. 0.	438193.43	561806.57	3725203.61
0.50. 0.	422741.40	577258.60	3725315.75
1. 0. 0.	407289.12	592710.88	3725452.81
1.10. 0.	391836.54	608163.46	3725614.80
1.20. 0.	376383.60	623616.40	3725801.72
1.30. 0.	360930.25	639069.75	3726013.58
1.40. 0.	345476.45	654523.55	3726250.38
1.50. 0.	330022.14	669977.86	3726512.14
2. 0. 0.	314567.27	685432.73	3726798.85
2.10. 0.	299111.79	700888.21	3727110.53
2.20. 0.	283655.66	716344.34	3727447.18
2.30. 0.	268198.81	731801.19	3727808.81
2.40. 0.	252741.20	747258.80	3728195.43
2.50. 0.	237282.77	762717.23	3728607.06
3. 0. 0.	221823.49	778176.51	3729043.70

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
		LATITUDE 33.50. 0.	
0. 0. 0.	500000.00	500000.00	3743482.65
0.10. 0.	484578.35	515421.65	3743495.13
0.20. 0.	469156.64	530843.36	3743532.60
0.30. 0.	453734.84	546265.16	3743595.04
0.40. 0.	438312.89	561687.11	3743682.47
0.50. 0.	422890.73	577109.27	3743794.88
1. 0. 0.	407468.33	592531.67	3743932.27
1.10. 0.	392045.62	607954.38	3744094.65
1.20. 0.	376622.57	623377.43	3744282.02
1.30. 0.	361199.12	638800.88	3744494.40
1.40. 0.	345775.21	654224.79	3744731.77
1.50. 0.	330350.81	669649.19	3744994.16
2. 0. 0.	314925.86	685074.14	3745281.57
2.10. 0.	299500.30	700499.70	3745594.00
2.20. 0.	284074.10	715925.90	3745931.46
2.30. 0.	268647.20	731352.80	3746293.97
2.40. 0.	253219.55	746780.45	3746681.53
2.50. 0.	237791.10	762208.90	3747094.15
3. 0. 0.	222361.80	777638.20	3747531.85
		LATITUDE 34. 0. 0.	
0. 0. 0.	500000.00	500000.00	3761961.53
0.10. 0.	484608.34	515391.66	3761974.05
0.20. 0.	469216.63	530783.37	3762011.60
0.30. 0.	453824.82	546175.18	3762074.19
0.40. 0.	438432.87	561567.13	3762161.83
0.50. 0.	423040.72	576959.28	3762274.50
1. 0. 0.	407648.32	592351.68	3762412.22
1.10. 0.	392255.62	607744.38	3762574.99
1.20. 0.	376862.59	623137.41	3762762.81
1.30. 0.	361469.15	638530.85	3762975.69
1.40. 0.	346075.28	653924.72	3763213.63
1.50. 0.	330680.91	669319.09	3763476.64
2. 0. 0.	315286.01	684713.99	3763764.73
2.10. 0.	299890.51	700109.49	3764077.90
2.20. 0.	284494.38	715505.62	3764416.17
2.30. 0.	269097.55	730902.45	3764779.54
2.40. 0.	253699.99	746300.01	3765168.02
2.50. 0.	238301.64	761698.36	3765581.62
3. 0. 0.	222902.46	777097.54	3766020.36

LATITUDE

34.10. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3780440.91
0.10. 0.	484638.46	515361.54	3780453.46
0.20. 0.	469276.88	530723.12	3780491.11
0.30. 0.	453915.20	546084.80	3780553.84
0.40. 0.	438553.37	561446.63	3780641.68
0.50. 0.	423191.35	576808.65	3780754.62
1. 0. 0.	407829.09	592170.91	3780892.66
1.10. 0.	392466.54	607533.46	3781055.81
1.20. 0.	377103.64	622896.36	3781244.07
1.30. 0.	361740.37	638259.63	3781457.45
1.40. 0.	346376.65	653623.35	3781695.95
1.50. 0.	331012.45	668987.55	3781959.58
2. 0. 0.	315647.72	684352.28	3782248.34
2.10. 0.	300282.41	699717.59	3782562.24
2.20. 0.	284916.48	715083.52	3782901.30
2.30. 0.	269549.86	730450.14	3783265.52
2.40. 0.	254182.52	745817.48	3783654.91
2.50. 0.	238814.40	761185.60	3784069.48
3. 0. 0.	223445.47	776554.53	3784509.24

LATITUDE

34.20. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3798920.81
0.10. 0.	484668.72	515331.28	3798933.39
0.20. 0.	469337.39	530662.61	3798971.12
0.30. 0.	454005.96	545994.04	3799034.00
0.40. 0.	438674.40	561325.60	3799122.04
0.50. 0.	423342.64	576657.36	3799235.24
1. 0. 0.	408010.64	591989.36	3799373.60
1.10. 0.	392678.36	607321.64	3799537.12
1.20. 0.	377345.75	622654.25	3799725.82
1.30. 0.	362012.75	637987.25	3799939.69
1.40. 0.	346679.33	653320.67	3800178.73
1.50. 0.	331345.43	668654.57	3800442.97
2. 0. 0.	316011.00	683989.00	3800732.39
2.10. 0.	300676.01	699323.99	3801047.02
2.20. 0.	285340.40	714659.60	3801386.86
2.30. 0.	270004.12	729995.88	3801751.92
2.40. 0.	254667.13	745332.87	3802142.20
2.50. 0.	239329.38	760670.62	3802557.72
3. 0. 0.	223990.82	776009.18	3802998.49

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 34.30. 0.		
0. 0. 0.	500000.00	500000.00	3817401.22
0.10. 0.	484699.10	515300.90	3817413.82
0.20. 0.	469398.16	530601.84	3817451.64
0.30. 0.	454097.12	545902.88	3817514.66
0.40. 0.	438795.94	561204.06	3817602.90
0.50. 0.	423494.57	576505.43	3817716.36
1. 0. 0.	408192.97	591807.03	3817855.03
1.10. 0.	392891.09	607108.91	3818018.92
1.20. 0.	377588.89	622411.11	3818208.04
1.30. 0.	362286.30	637713.70	3818422.40
1.40. 0.	346983.30	653016.70	3818661.99
1.50. 0.	331679.83	668320.17	3818926.82
2. 0. 0.	316375.84	683624.16	3819216.90
2.10. 0.	301071.30	698928.70	3819532.24
2.20. 0.	285766.14	714233.86	3819872.84
2.30. 0.	270460.33	729539.67	3820238.72
2.40. 0.	255153.82	744846.18	3820629.89
2.50. 0.	239846.56	760153.44	3821046.35
3. 0. 0.	224538.51	775461.49	3821488.11
	LATITUDE 34.40. 0.		
0. 0. 0.	500000.00	500000.00	3835882.13
0.10. 0.	484729.62	515270.38	3835894.76
0.20. 0.	469459.19	530540.81	3835932.66
0.30. 0.	454188.66	545811.34	3835995.83
0.40. 0.	438918.00	561082.00	3836084.27
0.50. 0.	423647.16	576352.84	3836197.97
1. 0. 0.	408376.09	591623.91	3836336.96
1.10. 0.	393104.74	606895.26	3836501.21
1.20. 0.	377833.06	622166.94	3836690.76
1.30. 0.	362561.02	637438.98	3836905.58
1.40. 0.	347288.57	652711.43	3837145.71
1.50. 0.	332015.66	667984.34	3837411.13
2. 0. 0.	316742.24	683257.76	3837701.85
2.10. 0.	301468.27	698531.73	3838017.89
2.20. 0.	286193.70	713806.30	3838359.26
2.30. 0.	270918.49	729081.51	3838725.95
2.40. 0.	255642.59	744357.41	3839117.98
2.50. 0.	240365.95	759634.05	3839535.36
3. 0. 0.	225088.53	774911.47	3839978.11

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 34.50. 0.		
0. 0. 0.	500000.00	500000.00	3854363.56
0.10. 0.	484760.26	515239.74	3854376.22
0.20. 0.	469520.47	530479.53	3854414.20
0.30. 0.	454280.60	545719.40	3854477.51
0.40. 0.	439040.59	560959.41	3854566.14
0.50. 0.	423800.39	576199.61	3854680.09
1. 0. 0.	408559.97	591440.03	3854819.38
1.10. 0.	393319.28	606680.72	3854984.00
1.20. 0.	378078.28	621921.72	3855173.95
1.30. 0.	362836.91	637163.09	3855389.25
1.40. 0.	347595.14	652404.86	3855629.90
1.50. 0.	332352.91	667647.09	3855895.90
2. 0. 0.	317110.19	682889.81	3856187.26
2.10. 0.	301866.92	698133.08	3856503.99
2.20. 0.	286623.07	713376.93	3856846.09
2.30. 0.	271378.58	728621.42	3857213.59
2.40. 0.	256133.42	743866.58	3857606.48
2.50. 0.	240887.54	759112.46	3858024.77
3. 0. 0.	225640.89	774359.11	3858468.48
	LATITUDE 35. 0. 0.		
0. 0. 0.	500000.00	500000.00	3872845.50
0.10. 0.	484791.03	515208.97	3872858.19
0.20. 0.	469582.02	530417.98	3872896.25
0.30. 0.	454372.92	545627.08	3872959.69
0.40. 0.	439163.68	560836.32	3873048.51
0.50. 0.	423954.27	576045.73	3873162.71
1. 0. 0.	408744.64	591255.36	3873302.30
1.10. 0.	393534.74	606465.26	3873467.27
1.20. 0.	378324.52	621675.48	3873657.63
1.30. 0.	363113.96	636886.04	3873873.39
1.40. 0.	347902.99	652097.01	3874114.56
1.50. 0.	332691.58	667308.42	3874381.13
2. 0. 0.	317479.68	682520.32	3874673.11
2.10. 0.	302267.25	697732.75	3874990.52
2.20. 0.	287054.25	712945.75	3875333.36
2.30. 0.	271840.62	728159.38	3875701.64
2.40. 0.	256626.33	743373.67	3876095.37
2.50. 0.	241411.32	758588.68	3876514.56
3. 0. 0.	226195.57	773804.43	3876959.22

Appendix B

NATIONAL TRANSVERSE MERCATOR

GRID TABLES

FOR LATITUDES

30.0.0-35. 0.0 DEGREES

CLARKE 1866 SPHEROID (METERS)

COORDINATES FOR 7 MIN. 30 SEC. INTERSECTIONS

LATITUDE

30. 0. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3318605.33
0. 7.30.	487943.79	512056.21	3318611.90
0.15. 0.	475887.55	524112.45	3318631.63
0.22.30.	463831.26	536168.74	3318664.51
0.30. 0.	451774.88	548225.12	3318710.54
0.37.30.	439718.38	560281.62	3318769.72
0.45. 0.	427661.74	572338.26	3318842.06
0.52.30.	415604.92	584395.08	3318927.55
1. 0. 0.	403547.90	596452.10	3319026.20
1. 7.30.	391490.65	608509.35	3319138.01
1.15. 0.	379433.14	620566.86	3319262.98
1.22.30.	367375.34	632624.66	3319401.11
1.30. 0.	355317.23	644682.77	3319552.41
1.37.30.	343258.76	656741.24	3319716.87
1.45. 0.	331199.92	668800.08	3319894.51
1.52.30.	319140.68	680859.32	3320085.31
2. 0. 0.	307081.00	692919.00	3320289.29
2. 7.30.	295020.86	704979.14	3320506.46
2.15. 0.	282960.23	717039.77	3320736.80
2.22.30.	270899.08	729100.92	3320980.33
2.30. 0.	258837.37	741162.63	3321237.06
2.37.30.	246775.10	753224.90	3321506.98
2.45. 0.	234712.21	765287.79	3321790.10
2.52.30.	222648.69	777351.31	3322086.42
3. 0. 0.	210584.50	789415.50	3322395.95

LATITUDE

30. 7.30.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3332455.97
0. 7.30.	487958.93	512041.07	3332462.57
0.15. 0.	475917.83	524082.17	3332482.34
0.22.30.	463876.67	536123.33	3332515.30
0.30. 0.	451835.43	548164.57	3332561.45
0.37.30.	439794.07	560205.93	3332620.78
0.45. 0.	427752.57	572247.43	3332693.30
0.52.30.	415710.89	584289.11	3332779.01
1. 0. 0.	403669.02	596330.98	3332877.91
1. 7.30.	391626.92	608373.08	3332990.00
1.15. 0.	379584.56	620415.44	3333115.28
1.22.30.	367541.91	632458.09	3333253.76
1.30. 0.	355498.95	644501.05	3333405.44
1.37.30.	343455.64	656544.36	3333570.32
1.45. 0.	331411.96	668588.04	3333748.40
1.52.30.	319367.88	680632.12	3333939.68
2. 0. 0.	307323.37	692676.63	3334144.16
2. 7.30.	295278.40	704721.60	3334361.88
2.15. 0.	283232.95	716767.05	3334592.81
2.22.30.	271186.97	728813.03	3334836.95
2.30. 0.	259140.46	740859.54	3335094.32
2.37.30.	247093.37	752906.63	3335364.92
2.45. 0.	235045.68	764954.32	3335648.75
2.52.30.	222997.36	777002.64	3335945.82
3. 0. 0.	210948.38	789051.62	3336256.13

LATITUDE

30.15. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3346306.89
0. 7.30.	487974.12	512025.88	3346313.50
0.15. 0.	475948.22	524051.78	3346333.32
0.22.30.	463922.26	536077.74	3346366.37
0.30. 0.	451896.21	548103.79	3346412.63
0.37.30.	439870.05	560129.95	3346472.11
0.45. 0.	427843.74	572156.26	3346544.81
0.52.30.	415817.27	584182.73	3346630.73
1. 0. 0.	403790.60	596209.40	3346729.88
1. 7.30.	391763.70	608236.30	3346842.24
1.15. 0.	379736.54	620263.46	3346967.84
1.22.30.	367709.11	632290.89	3347106.66
1.30. 0.	355681.35	644318.65	3347258.72
1.37.30.	343653.26	656346.74	3347424.00
1.45. 0.	331624.80	668375.20	3347602.53
1.52.30.	319595.94	680404.06	3347794.29
2. 0. 0.	307566.66	692433.34	3347999.29
2. 7.30.	295536.92	704463.08	3348217.54
2.15. 0.	283506.69	716493.31	3348449.04
2.22.30.	271475.96	728524.04	3348693.79
2.30. 0.	259444.69	740555.31	3348951.60
2.37.30.	247412.85	752587.15	3349223.07
2.45. 0.	235380.41	764619.59	3349507.61
2.52.30.	223347.35	776652.65	3349805.42
3. 0. 0.	211313.64	788686.36	3350116.50

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING

LATITUDE

30.22.30.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3360158.07
0. 7.30.	487989.37	512010.63	3360164.69
0.15. 0.	475978.72	524021.28	3360184.57
0.22.30.	463968.01	536031.99	3360217.69
0.30. 0.	451957.22	548042.78	3360264.07
0.37.30.	439946.31	560053.69	3360323.70
0.45. 0.	427935.26	572064.74	3360396.58
0.52.30.	415924.05	584075.95	3360482.71
1. 0. 0.	403912.63	596087.37	3360582.10
1. 7.30.	391901.00	608099.00	3360694.75
1.15. 0.	379889.10	620110.90	3360820.65
1.22.30.	367876.93	632123.07	3360959.82
1.30. 0.	355864.45	644135.55	3361112.24
1.37.30.	343851.63	656148.37	3361277.94
1.45. 0.	331838.44	668161.56	3361456.90
1.52.30.	319824.86	680175.14	3361649.14
2. 0. 0.	307810.86	692189.14	3361854.65
2. 7.30.	295796.41	704203.59	3362073.43
2.15. 0.	283781.47	716218.53	3362305.50
2.22.30.	271766.04	728233.96	3362550.86
2.30. 0.	259750.06	740249.94	3362809.50
2.37.30.	247733.53	752266.47	3363081.44
2.45. 0.	235716.40	764283.60	3363366.67
2.52.30.	223698.66	776301.34	3363665.21
3. 0. 0.	211680.27	788319.73	3363977.06

LATITUDE

30.30. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3374009.52
0. 7.30.	488004.68	511995.32	3374016.16
0.15. 0.	476009.34	523990.66	3374036.08
0.22.30.	464013.94	535986.06	3374069.29
0.30. 0.	452018.46	547981.54	3374115.78
0.37.30.	440022.86	559977.14	3374175.55
0.45. 0.	428027.13	571972.87	3374248.61
0.52.30.	416031.23	583968.77	3374334.95
1. 0. 0.	404035.13	595964.87	3374434.58
1. 7.30.	392038.81	607961.19	3374547.51
1.15. 0.	380042.24	619957.76	3374673.72
1.22.30.	368045.39	631954.61	3374813.22
1.30. 0.	356048.23	643951.77	3374966.02
1.37.30.	344050.74	655949.26	3375132.12
1.45. 0.	332052.88	667947.12	3375311.52
1.52.30.	320054.64	679945.36	3375504.22
2. 0. 0.	308055.98	691944.02	3375710.23
2. 7.30.	296056.87	703943.13	3375929.55
2.15. 0.	284057.28	715942.72	3376162.19
2.22.30.	272057.20	727942.80	3376408.14
2.30. 0.	260056.58	739943.42	3376667.42
2.37.30.	248055.41	751944.59	3376940.02
2.45. 0.	236053.65	763946.35	3377225.95
2.52.30.	224051.28	775948.72	3377525.22
3. 0. 0.	212048.27	787951.73	3377837.82

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 30.37.30.		
0. 0. 0.	500000.00	500000.00	3387861.24
0. 7.30.	488020.05	511979.95	3387867.89
0.15. 0.	476040.07	523959.93	3387887.87
0.22.30.	464060.04	535939.96	3387921.15
0.30. 0.	452079.92	547920.08	3387967.75
0.37.30.	440099.70	559900.30	3388027.67
0.45. 0.	428119.33	571880.67	3388100.90
0.52.30.	416138.80	583861.20	3388187.46
1. 0. 0.	404158.08	595841.92	3388287.33
1. 7.30.	392177.13	607822.87	3388400.52
1.15. 0.	380195.94	619804.06	3388527.04
1.22.30.	368214.47	631785.53	3388666.88
1.30. 0.	356232.70	643767.30	3388820.05
1.37.30.	344250.59	655749.41	3388986.55
1.45. 0.	332268.13	667731.87	3389166.38
1.52.30.	320285.27	679714.73	3389359.55
2. 0. 0.	308302.01	691697.99	3389566.06
2. 7.30.	296318.30	703681.70	3389785.91
2.15. 0.	284334.12	715665.88	3390019.10
2.22.30.	272349.45	727650.55	3390265.65
2.30. 0.	260364.25	739635.75	3390525.55
2.37.30.	248378.49	751621.51	3390798.81
2.45. 0.	236392.16	763607.84	3391085.43
2.52.30.	224405.22	775594.78	3391385.42
3. 0. 0.	212417.64	787582.36	3391698.78
	LATITUDE 30.45. 0.		
0. 0. 0.	500000.00	500000.00	3401713.22
0. 7.30.	488035.47	511964.53	3401719.90
0.15. 0.	476070.92	523929.08	3401739.92
0.22.30.	464106.31	535893.69	3401773.28
0.30. 0.	452141.62	547858.38	3401820.00
0.37.30.	440176.82	559823.18	3401880.06
0.45. 0.	428211.88	571788.12	3401953.47
0.52.30.	416246.78	583753.22	3402040.23
1. 0. 0.	404281.49	595718.51	3402140.34
1. 7.30.	392315.97	607684.03	3402253.80
1.15. 0.	380350.21	619649.79	3402380.62
1.22.30.	368384.18	631615.82	3402520.80
1.30. 0.	356417.85	643582.15	3402674.33
1.37.30.	344451.18	655548.82	3402841.23
1.45. 0.	332484.17	667515.83	3403021.49
1.52.30.	320516.76	679483.24	3403215.12
2. 0. 0.	308548.95	691451.05	3403422.12
2. 7.30.	296580.70	703419.30	3403642.50
2.15. 0.	284611.98	715388.02	3403876.25
2.22.30.	272642.78	727357.22	3404123.38
2.30. 0.	260673.05	739326.95	3404383.90
2.37.30.	248702.77	751297.23	3404657.81
2.45. 0.	236731.92	763268.08	3404945.12
2.52.30.	224760.47	775239.53	3405245.82
3. 0. 0.	212788.38	787211.62	3405559.93

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING

LATITUDE

30.52.30.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3415565.48
0. 7.30.	488050.95	511949.05	3415572.17
0.15. 0.	476101.88	523898.12	3415592.24
0.22.30.	464152.75	535847.25	3415625.68
0.30. 0.	452203.54	547796.46	3415672.51
0.37.30.	440254.22	559745.78	3415732.71
0.45. 0.	428304.77	571695.23	3415806.29
0.52.30.	416355.15	583644.85	3415893.26
1. 0. 0.	404405.35	595594.65	3415993.60
1. 7.30.	392455.32	607544.68	3416107.34
1.15. 0.	380505.06	619494.94	3416234.46
1.22.30.	368554.52	631445.48	3416374.96
1.30. 0.	356603.68	643396.32	3416528.86
1.37.30.	344652.52	655347.48	3416696.15
1.45. 0.	332701.00	667299.00	3416876.84
1.52.30.	320749.11	679250.89	3417070.93
2. 0. 0.	308796.81	691203.19	3417278.42
2. 7.30.	296844.07	703155.93	3417499.32
2.15. 0.	284890.87	715109.13	3417733.62
2.22.30.	272937.19	727062.81	3417981.34
2.30. 0.	260982.99	739017.01	3418242.47
2.37.30.	249028.25	750971.75	3418517.03
2.45. 0.	237072.93	762927.07	3418805.02
2.52.30.	225117.03	774882.97	3419106.43
3. 0. 0.	213160.49	786839.51	3419421.28

LATITUDE

31. 0. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3429418.01
0. 7.30.	488066.49	511933.51	3429424.72
0.15. 0.	476132.95	523867.05	3429444.83
0.22.30.	464199.36	535800.64	3429478.35
0.30. 0.	452265.69	547734.31	3429525.29
0.37.30.	440331.91	559668.09	3429585.63
0.45. 0.	428398.00	571602.00	3429659.38
0.52.30.	416463.93	583536.07	3429746.55
1. 0. 0.	404529.67	595470.33	3429847.14
1. 7.30.	392595.19	607404.81	3429961.13
1.15. 0.	380660.47	619339.53	3430088.55
1.22.30.	368725.48	631274.52	3430229.39
1.30. 0.	356790.20	643209.80	3430383.65
1.37.30.	344854.59	655145.41	3430551.33
1.45. 0.	332918.64	667081.36	3430732.44
1.52.30.	320982.31	679017.69	3430926.98
2. 0. 0.	309045.57	690954.43	3431134.96
2. 7.30.	297108.41	702891.59	3431356.37
2.15. 0.	285170.79	714829.21	3431591.22
2.22.30.	273232.68	726767.32	3431839.52
2.30. 0.	261294.07	738705.93	3432101.27
2.37.30.	249354.92	750645.08	3432376.47
2.45. 0.	237415.20	762584.80	3432665.12
2.52.30.	225474.89	774525.11	3432967.24
3. 0. 0.	213533.97	786466.03	3433282.83

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING

LATITUDE

31. 7.30.

0. 0. 0.	500000.00	500000.00	3443270.81
0. 7.30.	488082.08	511917.92	3443277.53
0.15. 0.	476164.14	523835.86	3443297.69
0.22.30.	464246.15	535753.85	3443331.29
0.30. 0.	452328.07	547671.93	3443378.33
0.37.30.	440409.89	559590.11	3443438.82
0.45. 0.	428491.57	571508.43	3443512.74
0.52.30.	416573.10	583426.90	3443600.11
1. 0. 0.	404654.44	595345.56	3443700.93
1. 7.30.	392735.56	607264.44	3443815.19
1.15. 0.	380816.45	619183.55	3443942.90
1.22.30.	368897.07	631102.93	3444084.07
1.30. 0.	356977.40	643022.60	3444238.68
1.37.30.	345057.41	654942.59	3444406.76
1.45. 0.	333137.07	666862.93	3444588.29
1.52.30.	321216.36	678783.64	3444783.28
2. 0. 0.	309295.25	690704.75	3444991.73
2. 7.30.	297373.71	702626.29	3445213.66
2.15. 0.	285451.72	714548.28	3445449.06
2.22.30.	273529.26	726470.74	3445697.93
2.30. 0.	261606.28	738393.72	3445960.28
2.37.30.	249682.78	750317.22	3446236.12
2.45. 0.	237758.72	762241.28	3446525.44
2.52.30.	225834.07	774165.93	3446828.26
3. 0. 0.	213908.81	786091.19	3447144.57

LATITUDE

31.15. 0.

0. 0. 0.	500000.00	500000.00	3457123.88
0. 7.30.	488097.73	511902.27	3457130.62
0.15. 0.	476195.44	523804.56	3457150.83
0.22.30.	464293.10	535706.90	3457184.50
0.30. 0.	452390.68	547609.32	3457231.65
0.37.30.	440488.15	559511.85	3457292.28
0.45. 0.	428585.49	571414.51	3457366.37
0.52.30.	416682.67	583317.33	3457453.94
1. 0. 0.	404779.66	595220.34	3457554.99
1. 7.30.	392876.45	607123.55	3457669.51
1.15. 0.	380973.00	619027.00	3457797.52
1.22.30.	369069.28	630930.72	3457939.00
1.30. 0.	357165.28	642834.72	3458093.97
1.37.30.	345260.96	654739.04	3458262.43
1.45. 0.	333356.29	666643.71	3458444.38
1.52.30.	321451.26	678548.74	3458639.82
2. 0. 0.	309545.83	690454.17	3458848.75
2. 7.30.	297639.98	702360.02	3459071.18
2.15. 0.	285733.68	714266.32	3459307.12
2.22.30.	273826.91	726173.09	3459556.56
2.30. 0.	261919.64	738080.36	3459819.51
2.37.30.	250011.84	749988.16	3460095.98
2.45. 0.	238103.48	761896.52	3460385.97
2.52.30.	226194.55	773805.45	3460689.48
3. 0. 0.	214285.01	785714.99	3461006.52

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
LATITUDE 31.22.30.			
0. 0. 0.	500000.00	500000.00	3470977.23
0. 7.30.	488113.44	511886.56	3470983.98
0.15. 0.	476226.86	523773.14	3471004.23
0.22.30.	464340.22	535659.78	3471037.99
0.30. 0.	452453.51	547546.49	3471085.24
0.37.30.	440566.69	559433.31	3471146.00
0.45. 0.	428679.74	571320.26	3471220.27
0.52.30.	416792.63	583207.37	3471308.04
1. 0. 0.	404905.34	595094.66	3471409.31
1. 7.30.	393017.84	606982.16	3471524.10
1.15. 0.	381130.11	618869.89	3471652.39
1.22.30.	369242.12	630757.88	3471794.20
1.30. 0.	357353.84	642646.16	3471949.52
1.37.30.	345465.24	654534.76	3472118.36
1.45. 0.	333576.31	666423.69	3472300.72
1.52.30.	321687.01	678312.99	3472496.60
2. 0. 0.	309797.32	690202.68	3472706.01
2. 7.30.	297907.21	702092.79	3472928.94
2.15. 0.	286016.66	713983.34	3473165.41
2.22.30.	274125.64	725874.36	3473415.42
2.30. 0.	262234.12	737765.88	3473678.97
2.37.30.	250342.08	749657.92	3473956.06
2.45. 0.	238449.49	761550.51	3474246.70
2.52.30.	226556.33	773443.67	3474550.90
3. 0. 0.	214662.57	785337.43	3474868.66
LATITUDE 31.30. 0.			
0. 0. 0.	500000.00	500000.00	3484830.85
0. 7.30.	488129.21	511870.79	3484837.61
0.15. 0.	476258.39	523741.61	3484857.91
0.22.30.	464387.51	535612.49	3484891.74
0.30. 0.	452516.56	547483.44	3484939.10
0.37.30.	440645.51	559354.49	3485000.00
0.45. 0.	428774.33	571225.67	3485074.43
0.52.30.	416902.99	583097.01	3485162.40
1. 0. 0.	405031.48	594968.52	3485263.90
1. 7.30.	393159.75	606840.25	3485378.94
1.15. 0.	381287.79	618712.21	3485507.52
1.22.30.	369415.58	630584.42	3485649.65
1.30. 0.	357543.08	642456.92	3485805.32
1.37.30.	345670.27	654329.73	3485974.54
1.45. 0.	333797.12	666202.88	3486157.30
1.52.30.	321923.61	678076.39	3486353.62
2. 0. 0.	310049.71	689950.29	3486563.50
2. 7.30.	298175.41	701824.59	3486786.94
2.15. 0.	286300.66	713699.34	3487023.94
2.22.30.	274425.44	725574.56	3487274.51
2.30. 0.	262549.74	737450.26	3487538.64
2.37.30.	250673.52	749326.48	3487816.36
2.45. 0.	238796.75	761203.25	3488107.65
2.52.30.	226919.42	773080.58	3488412.53
3. 0. 0.	215041.49	784958.51	3488731.00

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING

LATITUDE

31.37.30.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3498684.74
0. 7.30.	488145.03	511854.97	3498691.52
0.15. 0.	476290.03	523709.97	3498711.86
0.22.30.	464434.98	535565.02	3498745.77
0.30. 0.	452579.85	547420.15	3498793.24
0.37.30.	440724.62	559275.38	3498854.27
0.45. 0.	428869.26	571130.74	3498928.86
0.52.30.	417013.75	582986.25	3499017.02
1. 0. 0.	405158.06	594841.94	3499118.75
1. 7.30.	393302.16	606697.84	3499234.05
1.15. 0.	381446.04	618553.96	3499362.92
1.22.30.	369589.66	630410.34	3499505.36
1.30. 0.	357732.99	642267.01	3499661.37
1.37.30.	345876.02	654123.98	3499830.97
1.45. 0.	334018.72	665981.28	3500014.14
1.52.30.	322161.06	677838.94	3500210.90
2. 0. 0.	310303.01	689696.99	3500421.24
2. 7.30.	298444.56	701555.44	3500645.17
2.15. 0.	286585.67	713414.33	3500882.70
2.22.30.	274726.32	725273.68	3501133.82
2.30. 0.	262866.48	737133.52	3501398.54
2.37.30.	251006.14	748993.86	3501676.87
2.45. 0.	239145.25	760854.75	3501968.81
2.52.30.	227283.80	772716.20	3502274.37
3. 0. 0.	215421.77	784578.23	3502593.54

LATITUDE

31.45. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3512538.91
0. 7.30.	488160.90	511839.10	3512545.70
0.15. 0.	476321.78	523678.22	3512566.09
0.22.30.	464482.61	535517.39	3512600.07
0.30. 0.	452643.36	547356.64	3512647.64
0.37.30.	440804.01	559195.99	3512708.81
0.45. 0.	428964.53	571035.47	3512783.57
0.52.30.	417124.90	582875.10	3512871.92
1. 0. 0.	405285.10	594714.90	3512973.87
1. 7.30.	393445.09	606554.91	3513089.42
1.15. 0.	381604.85	618395.15	3513218.57
1.22.30.	369764.36	630235.64	3513361.33
1.30. 0.	357923.59	642076.41	3513517.69
1.37.30.	346082.52	653917.48	3513687.65
1.45. 0.	334241.11	665758.89	3513871.23
1.52.30.	322399.36	677600.64	3514068.41
2. 0. 0.	310557.22	689442.78	3514279.22
2. 7.30.	298714.68	701285.32	3514503.64
2.15. 0.	286871.70	713128.30	3514741.69
2.22.30.	275028.27	724971.73	3514993.36
2.30. 0.	263184.36	736815.64	3515258.67
2.37.30.	251339.94	748660.06	3515537.61
2.45. 0.	239495.00	760505.00	3515830.19
2.52.30.	227649.49	772350.51	3516136.41
3. 0. 0.	215803.40	784196.60	3516456.28

LATITUDE

31.52.30.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3526393.35
0. 7.30.	488176.84	511823.16	3526400.16
0.15. 0.	476353.65	523646.35	3526420.59
0.22.30.	464530.41	535469.59	3526454.64
0.30. 0.	452707.09	547292.91	3526502.32
0.37.30.	440883.68	559116.32	3526563.62
0.45. 0.	429060.14	570939.86	3526638.54
0.52.30.	417236.45	582763.55	3526727.09
1. 0. 0.	405412.58	594587.42	3526829.26
1. 7.30.	393588.52	606411.48	3526945.06
1.15. 0.	381764.22	618235.78	3527074.49
1.22.30.	369939.68	630060.32	3527217.56
1.30. 0.	358114.86	641885.14	3527374.25
1.37.30.	346289.74	653710.26	3527544.59
1.45. 0.	334464.30	665535.70	3527728.56
1.52.30.	322638.50	677361.50	3527926.18
2. 0. 0.	310812.32	689187.68	3528137.44
2. 7.30.	298985.75	701014.25	3528362.35
2.15. 0.	287158.75	712841.25	3528600.91
2.22.30.	275331.30	724668.70	3528853.13
2.30. 0.	263503.37	736496.63	3529119.01
2.37.30.	251674.94	748325.06	3529398.56
2.45. 0.	239845.98	760154.02	3529691.77
2.52.30.	228016.47	771983.53	3529998.66
3. 0. 0.	216186.39	783813.61	3530319.22

LATITUDE

32. 0. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3540248.07
0. 7.30.	488192.83	511807.17	3540254.89
0.15. 0.	476385.63	523614.37	3540275.37
0.22.30.	464578.38	535421.62	3540309.49
0.30. 0.	452771.06	547228.94	3540357.27
0.37.30.	440963.63	559036.37	3540418.70
0.45. 0.	429156.09	570843.91	3540493.78
0.52.30.	417348.39	582651.61	3540582.52
1. 0. 0.	405540.52	594459.48	3540684.91
1. 7.30.	393732.45	606267.55	3540800.96
1.15. 0.	381924.16	618075.84	3540930.67
1.22.30.	370115.62	629884.38	3541074.04
1.30. 0.	358306.81	641693.19	3541231.08
1.37.30.	346497.70	653502.30	3541401.78
1.45. 0.	334688.27	665311.73	3541586.15
1.52.30.	322878.48	677121.52	3541784.19
2. 0. 0.	311068.33	688931.67	3541995.90
2. 7.30.	299257.78	700742.22	3542221.30
2.15. 0.	287446.81	712553.19	3542460.37
2.22.30.	275635.39	724364.61	3542713.13
2.30. 0.	263823.50	736176.50	3542979.58
2.37.30.	252011.11	747988.89	3543259.73
2.45. 0.	240198.20	759801.80	3543553.57
2.52.30.	228384.75	771615.25	3543861.11
3. 0. 0.	216570.72	783429.28	3544182.37

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING

LATITUDE

32. 7.30.

0. 0. 0.	500000.00	500000.00	3554103.06
0. 7.30.	488208.87	511791.13	3554109.90
0.15. 0.	476417.72	523582.28	3554130.42
0.22.30.	464626.52	535373.48	3554164.62
0.30. 0.	452835.24	547164.76	3554212.50
0.37.30.	441043.87	558956.13	3554274.06
0.45. 0.	429252.37	570747.63	3554349.30
0.52.30.	417460.73	582539.27	3554438.23
1. 0. 0.	405668.91	594331.09	3554540.84
1. 7.30.	393876.90	606123.10	3554657.13
1.15. 0.	382084.66	617915.34	3554787.12
1.22.30.	370292.18	629707.82	3554930.79
1.30. 0.	358499.43	641500.57	3555088.16
1.37.30.	346706.39	653293.61	3555259.22
1.45. 0.	334913.02	665086.98	3555443.98
1.52.30.	323119.31	676880.69	3555642.44
2. 0. 0.	311325.24	688674.76	3555854.61
2. 7.30.	299530.77	700469.23	3556080.48
2.15. 0.	287735.88	712264.12	3556320.06
2.22.30.	275940.55	724059.45	3556573.36
2.30. 0.	264144.75	735855.25	3556840.38
2.37.30.	252348.47	747651.53	3557121.11
2.45. 0.	240551.66	759448.34	3557415.58
2.52.30.	228754.32	771245.68	3557723.78
3. 0. 0.	216956.41	783043.59	3558045.71

LATITUDE

32.15. 0.

0. 0. 0.	500000.00	500000.00	3567958.33
0. 7.30.	488224.97	511775.03	3567965.19
0.15. 0.	476449.92	523550.08	3567985.75
0.22.30.	464674.82	535325.18	3568020.02
0.30. 0.	452899.65	547100.35	3568068.00
0.37.30.	441124.38	558875.62	3568129.69
0.45. 0.	429348.99	570651.01	3568205.09
0.52.30.	417573.45	582426.55	3568294.20
1. 0. 0.	405797.75	594202.25	3568397.03
1. 7.30.	394021.85	605978.15	3568513.57
1.15. 0.	382245.72	617754.28	3568643.83
1.22.30.	370469.36	629530.64	3568787.80
1.30. 0.	358692.73	641307.27	3568945.50
1.37.30.	346915.81	653084.19	3569116.92
1.45. 0.	335138.57	664861.43	3569302.07
1.52.30.	323360.99	676639.01	3569500.95
2. 0. 0.	311583.04	688416.96	3569713.36
2. 7.30.	299804.71	700195.29	3569939.90
2.15. 0.	288025.96	711974.04	3570179.79
2.22.30.	276246.78	723753.22	3570433.32
2.30. 0.	264467.13	735532.87	3570701.39
2.37.30.	252687.00	747313.00	3570982.72
2.45. 0.	240906.36	759093.64	3571277.81
2.52.30.	229125.18	770874.82	3571586.65
3. 0. 0.	217343.44	782656.56	3571909.26

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 32.22.30.		
0. 0. 0.	500000.00	500000.00	3581813.88
0. 7.30.	488241.13	511758.87	3581820.75
0.15. 0.	476482.24	523517.76	3581841.35
0.22.30.	464723.30	535276.70	3581875.70
0.30. 0.	452964.29	547035.71	3581923.78
0.37.30.	441205.18	558794.82	3581985.59
0.45. 0.	429445.95	570554.05	3582061.15
0.52.30.	417686.57	582313.43	3582150.45
1. 0. 0.	405927.03	594072.97	3582253.49
1. 7.30.	394167.30	605832.70	3582370.27
1.15. 0.	382407.35	617592.65	3582500.80
1.22.30.	370647.16	629352.84	3582645.08
1.30. 0.	358886.70	641113.30	3582803.10
1.37.30.	347125.95	652874.05	3582974.88
1.45. 0.	335364.90	664635.10	3583160.41
1.52.30.	323603.50	676396.50	3583359.70
2. 0. 0.	311841.75	688158.25	3583572.75
2. 7.30.	300079.60	699920.40	3583799.57
2.15. 0.	288317.06	711682.94	3584040.15
2.22.30.	276554.07	723445.93	3584294.51
2.30. 0.	264790.63	735209.37	3584562.64
2.37.30.	253026.71	746973.29	3584844.55
2.45. 0.	241262.29	758737.71	3585140.25
2.52.30.	229497.33	770502.67	3585449.73
3. 0. 0.	217731.83	782268.17	3585773.01
	LATITUDE 32.30. 0.		
0. 0. 0.	500000.00	500000.00	3595669.71
0. 7.30.	488257.35	511742.65	3595676.59
0.15. 0.	476514.67	523485.33	3595697.24
0.22.30.	464771.94	535228.06	3595731.65
0.30. 0.	453029.15	546970.85	3595779.83
0.37.30.	441286.25	558713.75	3595841.77
0.45. 0.	429543.24	570456.76	3595917.49
0.52.30.	417800.09	582199.91	3596006.97
1. 0. 0.	406056.77	593943.23	3596110.22
1. 7.30.	394313.26	605686.74	3596227.24
1.15. 0.	382569.53	617430.47	3596358.04
1.22.30.	370825.57	629174.43	3596502.61
1.30. 0.	359081.34	640918.66	3596660.96
1.37.30.	347336.83	652663.17	3596833.09
1.45. 0.	335592.01	664407.99	3597019.00
1.52.30.	323846.86	676153.14	3597218.70
2. 0. 0.	312101.34	687898.66	3597432.19
2. 7.30.	300355.45	699644.55	3597659.47
2.15. 0.	288609.16	711390.34	3597900.55
2.22.30.	276862.43	723137.57	3598155.43
2.30. 0.	265115.25	734884 75	3598424.11
2.37.30.	253367.60	746632.40	3598706.60
2.45. 0.	241619.45	758380.55	3599002.90
2.52.30.	229870.77	770129.23	3599313.02
3. 0. 0.	218121.55	781878.45	3599636.96

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 32.37.30.		
0. 0. 0.	500000.00	500000.00	3609525.81
0. 7.30.	488273.62	511726.38	3609532.71
0.15. 0.	476547.21	523452.79	3609553.40
0.22.30.	464820.75	535179.25	3609587.88
0.30. 0.	453094.23	546905.77	3609636.16
0.37.30.	441367.61	558632.39	3609698.23
0.45. 0.	429640.87	570359.13	3609774.09
0.52.30.	417913.99	582086.01	3609863.76
1. 0. 0.	406186.95	593813.05	3609967.22
1. 7.30.	394459.72	605540.28	3610084.48
1.15. 0.	382732.27	617267.73	3610215.54
1.22.30.	371004.59	628995.41	3610360.41
1.30. 0.	359276.65	640723.35	3610519.08
1.37.30.	347548.43	652451.57	3610691.56
1.45. 0.	335819.91	664180.09	3610877.85
1.52.30.	324091.05	675908.95	3611077.95
2. 0. 0.	312361.84	687638.16	3611291.88
2. 7.30.	300632.25	699367.75	3611519.62
2.15. 0.	288902.26	711097.74	3611761.19
2.22.30.	277171.85	722828.15	3612016.58
2.30. 0.	265441.00	734559.00	3612285.81
2.37.30.	253709.67	746290.33	3612568.87
2.45. 0.	241977.84	758022.16	3612865.77
2.52.30.	230245.50	769754.50	3613176.52
3. 0. 0.	218512.62	781487.38	3613501.12

LATITUDE

32.45. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3623382.20
0. 7.30.	488289.94	511710.06	3623389.11
0.15. 0.	476579.86	523420.14	3623409.84
0.22.30.	464869.73	535130.27	3623444.39
0.30. 0.	453159.53	546840.47	3623492.76
0.37.30.	441449.24	558550.76	3623554.96
0.45. 0.	429738.84	570261.16	3623630.98
0.52.30.	418028.29	581971.71	3623720.82
1. 0. 0.	406317.58	593682.42	3623824.49
1. 7.30.	394606.68	605393.32	3623941.99
1.15. 0.	382895.57	617104.43	3624073.31
1.22.30.	371184.23	628815.77	3624218.47
1.30. 0.	359472.64	640527.36	3624377.46
1.37.30.	347760.76	652239.24	3624550.28
1.45. 0.	336048.58	663951.42	3624736.95
1.52.30.	324336.08	675663.92	3624937.46
2. 0. 0.	312623.23	687376.77	3625151.81
2. 7.30.	300910.00	699090.00	3625380.01
2.15. 0.	289196.38	710803.62	3625622.06
2.22.30.	277482.34	722517.66	3625877.96
2.30. 0.	265767.85	734232.15	3626147.73
2.37.30.	254052.90	745947.10	3626431.36
2.45. 0.	242337.46	757662.54	3626728.86
2.52.30.	230621.51	769378.49	3627040.23
3. 0. 0.	218905.03	781094.97	3627365.47

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
LATITUDE 32.52.30.			
0. 0. 0.	500000.00	500000.00	3637238.86
0. 7.30.	488306.32	511693.68	3637245.79
0.15. 0.	476612.62	523387.38	3637266.56
0.22.30.	464918.88	535081.12	3637301.18
0.30. 0.	453225.06	546774.94	3637349.65
0.37.30.	441531.16	558468.84	3637411.97
0.45. 0.	429837.14	570162.86	3637488.14
0.52.30.	418142.97	581857.03	3637578.16
1. 0. 0.	406448.65	593551.35	3637682.03
1. 7.30.	394754.15	605245.85	3637799.76
1.15. 0.	383059.43	616940.57	3637931.35
1.22.30.	371364.49	628635.51	3638076.79
1.30. 0.	359669.29	640330.71	3638236.10
1.37.30.	347973.82	652026.18	3638409.27
1.45. 0.	336278.05	663721.95	3638596.30
1.52.30.	324581.95	675418.05	3638797.21
2. 0. 0.	312885.51	687114.49	3639011.98
2. 7.30.	301188.70	698811.30	3639240.64
2.15. 0.	289491.50	710508.50	3639483.17
2.22.30.	277793.88	722206.12	3639739.58
2.30. 0.	266095.83	733904.17	3640009.88
2.37.30.	254397.31	745602.69	3640294.07
2.45. 0.	242698.31	757301.69	3640592.16
2.52.30.	230998.81	769001.19	3640904.15
3. 0. 0.	219298.78	780701.22	3641230.04
LATITUDE 33. 0. 0.			
0. 0. 0.	500000.00	500000.00	3651095.81
0. 7.30.	488322.76	511677.24	3651102.74
0.15. 0.	476645.50	523354.50	3651123.56
0.22.30.	464968.19	535031.81	3651158.25
0.30. 0.	453290.82	546709.18	3651206.81
0.37.30.	441613.35	558386.65	3651269.25
0.45. 0.	429935.77	570064.23	3651345.57
0.52.30.	418258.05	581741.95	3651435.77
1. 0. 0.	406580.17	593419.83	3651539.85
1. 7.30.	394902.11	605097.89	3651657.81
1.15. 0.	383223.85	616776.15	3651789.65
1.22.30.	371545.36	628454.64	3651935.38
1.30. 0.	359866.61	640133.39	3652095.00
1.37.30.	348187.60	651812.40	3652268.51
1.45. 0.	336508.29	663491.71	3652455.91
1.52.30.	324828.65	675171.35	3652657.21
2. 0. 0.	313148.68	686851.32	3652872.41
2. 7.30.	301468.34	698531.66	3653101.51
2.15. 0.	289787.62	710212.38	3653344.51
2.22.30.	278106.48	721893.52	3653601.43
2.30. 0.	266424.91	733575.09	3653872.26
2.37.30.	254742.89	745257.11	3654157.01
2.45. 0.	243060.39	756939.61	3654455.63
2.52.30.	231377.39	768622.61	3654768.28
3. 0. 0.	219693.86	780306.14	3655094.81

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE		
	33. 7.30.		
0. 0. 0.	500000.00	500000.00	3664953.03
0. 7.30.	488339.25	511660.75	3664959.98
0.15. 0.	476678.49	523321.51	3664980.84
0.22.30.	465017.67	534982.33	3665015.59
0.30. 0.	453356.79	546643.21	3665064.25
0.37.30.	441695.82	558304.18	3665126.81
0.45. 0.	430034.74	569965.26	3665203.28
0.52.30.	418373.52	581626.48	3665293.65
1. 0. 0.	406712.14	593287.86	3665397.93
1. 7.30.	395050.58	604949.42	3665516.12
1.15. 0.	383388.82	616611.18	3665648.22
1.22.30.	371726.84	628273.16	3665794.24
1.30. 0.	360064.60	639935.40	3665954.16
1.37.30.	348402.10	651597.90	3666128.01
1.45. 0.	336739.30	663260.70	3666315.77
1.52.30.	325076.19	674923.81	3666517.46
2. 0. 0.	313412.74	686587.26	3666733.08
2. 7.30.	301748.93	698251.07	3666962.62
2.15. 0.	290084.74	709915.26	3667206.10
2.22.30.	278420.14	721579.86	3667463.51
2.30. 0.	266755.12	733244.88	3667734.87
2.37.30.	255089.64	744910.36	3668020.16
2.45. 0.	243423.69	756576.31	3668319.41
2.52.30.	231757.24	768242.76	3668632.62
3. 0. 0.	220090.28	779909.72	3668959.78
	LATITUDE		
	33.15. 0.		
0. 0. 0.	500000.00	500000.00	3678810.54
0. 7.30.	488355.80	511644.20	3678817.50
0.15. 0.	476711.58	523288.42	3678838.40
0.22.30.	465067.32	534932.68	3678873.22
0.30. 0.	453422.99	546577.01	3678921.97
0.37.30.	441778.57	558221.43	3678984.65
0.45. 0.	430134.04	569865.96	3679061.27
0.52.30.	418439.37	581510.63	3679151.81
1. 0. 0.	406844.55	593155.45	3679256.29
1. 7.30.	395199.55	604800.45	3679374.71
1.15. 0.	383554.35	616445.65	3679507.06
1.22.30.	371908.93	628091.07	3679653.36
1.30. 0.	360263.26	639736.74	3679813.59
1.37.30.	348617.33	651382.67	3679987.77
1.45. 0.	336971.10	663028.90	3680175.89
1.52.30.	325324.57	674675.43	3680377.97
2. 0. 0.	313677.69	686322.31	3680593.99
2. 7.30.	302030.47	697969.53	3680823.98
2.15. 0.	290382.86	709617.14	3681067.92
2.22.30.	278734.86	721265.14	3681325.83
2.30. 0.	267086.43	732913.57	3681597.70
2.37.30.	255437.55	744562.45	3681883.55
2.45. 0.	243788.21	756211.79	3682183.37
2.52.30.	232138.38	767861.62	3682497.17
3. 0. 0.	220488.04	779511.96	3682824.96

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE		
	33.22.30.		
0. 0. 0.	500000.00	500000.00	3692668.33
0. 7.30.	488372.41	511627.59	3692675.31
0.15. 0.	476744.79	523255.21	3692696.24
0.22.30.	465117.13	534882.87	3692731.13
0.30. 0.	453489.41	546510.59	3692779.97
0.37.30.	441861.59	558138.41	3692842.77
0.45. 0.	430233.67	569766.33	3692919.53
0.52.30.	418605.62	581394.38	3693010.25
1. 0. 0.	406977.41	593022.59	3693114.93
1. 7.30.	395349.02	604650.98	3693233.57
1.15. 0.	383720.44	616279.56	3693366.17
1.22.30.	372091.63	627908.37	3693512.74
1.30. 0.	360462.58	639537.42	3693673.28
1.37.30.	348833.27	651166.73	3693847.79
1.45. 0.	337203.68	662796.32	3694036.27
1.52.30.	325573.77	674426.23	3694238.72
2. 0. 0.	313943.53	686056.47	3694455.16
2. 7.30.	302312.95	697687.05	3694685.58
2.15. 0.	290681.98	709318.02	3694929.98
2.22.30.	279050.63	720949.37	3695188.38
2.30. 0.	267418.85	732581.15	3695460.77
2.37.30.	255786.63	744213.37	3695747.15
2.45. 0.	244153.95	755846.05	3696047.54
2.52.30.	232520.79	767479.21	3696361.93
3. 0. 0.	220887.12	779112.88	3696690.34
	LATITUDE		
	33.30. 0.		
0. 0. 0.	500000.00	500000.00	3706526.40
0. 7.30.	488389.07	511610.93	3706533.39
0.15. 0.	476778.11	523221.89	3706554.36
0.22.30.	465167.11	534832.89	3706589.32
0.30. 0.	453556.05	546443.95	3706638.25
0.37.30.	441944.90	558055.10	3706701.17
0.45. 0.	430333.64	569666.36	3706778.07
0.52.30.	418722.25	581277.75	3706868.96
1. 0. 0.	407110.70	592889.30	3706973.84
1. 7.30.	395498.99	604501.01	3707092.70
1.15. 0.	383887.07	616112.93	3707225.55
1.22.30.	372274.94	627725.06	3707372.39
1.30. 0.	360662.57	639337.43	3707533.23
1.37.30.	349049.94	650950.06	3707708.07
1.45. 0.	337437.03	662562.97	3707896.90
1.52.30.	325823.81	674176.19	3708099.73
2. 0. 0.	314210.26	685789.74	3708316.57
2. 7.30.	302596.37	697403.63	3708547.42
2.15. 0.	290982.10	709017.90	3708792.29
2.22.30.	279367.45	720632.55	3709051.16
2.30. 0.	267752.38	732247.62	3709324.06
2.37.30.	256136.88	743863.12	3709610.98
2.45. 0.	244520.92	755479.08	3709911.93
2.52.30.	232904.48	767095.52	3710226.91
3. 0. 0.	221287.54	778712.46	3710555.93

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING

LATITUDE

33.37.30.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3720384.76
0. 7.30.	488405.78	511594.22	3720391.76
0.15. 0.	476811.54	523188.46	3720412.77
0.22.30.	465217.26	534782.74	3720447.79
0.30. 0.	453622.91	546377.09	3720496.82
0.37.30.	442028.48	557971.52	3720559.85
0.45. 0.	430433.94	569566.06	3720636.90
0.52.30.	418839.27	581160.73	3720727.95
1. 0. 0.	407244.44	592755.56	3720833.02
1. 7.30.	395649.45	604350.55	3720952.10
1.15. 0.	384054.26	615945.74	3721085.20
1.22.30.	372458.86	627541.14	3721232.31
1.30. 0.	360863.22	639136.78	3721393.45
1.37.30.	349267.33	650732.67	3721568.60
1.45. 0.	337671.15	662328.85	3721757.79
1.52.30.	326074.67	673925.33	3721961.00
2. 0. 0.	314477.87	685522.13	3722178.24
2. 7.30.	302880.73	697119.27	3722409.51
2.15. 0.	291283.22	708716.78	3722654.83
2.22.30.	279685.32	720314.68	3722914.18
2.30. 0.	268087.02	731912.98	3723187.58
2.37.30.	256488.28	743511.72	3723475.03
2.45. 0.	244889.09	755110.91	3723776.54
2.52.30.	233289.43	766710.57	3724092.10
3. 0. 0.	221689.28	778310.72	3724421.73

LATITUDE

33.45. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3734243.40
0. 7.30.	488422.55	511577.45	3734250.41
0.15. 0.	476845.08	523154.92	3734271.46
0.22.30.	465267.57	534732.43	3734306.54
0.30. 0.	453689.99	546310.01	3734355.66
0.37.30.	442112.33	557887.67	3734418.81
0.45. 0.	430534.57	569465.43	3734495.99
0.52.30.	418956.67	581043.33	3734587.22
1. 0. 0.	407378.63	592621.37	3734692.48
1. 7.30.	395800.41	604199.59	3734811.78
1.15. 0.	384222.01	615777.99	3734945.12
1.22.30.	372643.39	627356.61	3735092.50
1.30. 0.	361064.54	638935.46	3735253.93
1.37.30.	349485.43	650514.57	3735429.41
1.45. 0.	337906.05	662093.95	3735618.93
1.52.30.	326326.37	673673.63	3735822.51
2. 0. 0.	314746.37	685253.63	3736040.15
2. 7.30.	303166.03	696833.97	3736271.85
2.15. 0.	291585.33	708414.67	3736517.61
2.22.30.	280004.25	719995.75	3736777.44
2.30. 0.	268422.76	731577.24	3737051.34
2.37.30.	256840.85	743159.15	3737339.31
2.45. 0.	245258.49	754741.51	3737641.36
2.52.30.	233675.66	766324.34	3737957.50
3. 0. 0.	222092.35	777907.65	3738287.73

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING

LATITUDE

33.52.30.

0. 0. 0.	500000.00	500000.00	3748102.32
0. 7.30.	488439.38	511560.62	3748109.35
0.15. 0.	476878.73	523121.27	3748130.43
0.22.30.	465318.05	534681.95	3748165.58
0.30. 0.	453757.30	546242.70	3748214.78
0.37.30.	442196.47	557803.53	3748278.05
0.45. 0.	430635.53	569364.47	3748355.37
0.52.30.	419074.46	580925.54	3748446.76
1. 0. 0.	407513.25	592486.75	3748552.21
1. 7.30.	395951.87	604048.13	3748671.72
1.15. 0.	384390.30	615609.70	3748805.30
1.22.30.	372828.53	627171.47	3748952.95
1.30. 0.	361266.52	638733.48	3749114.67
1.37.30.	349704.25	650295.75	3749290.47
1.45. 0.	338141.72	661858.28	3749480.34
1.52.30.	326578.89	673421.11	3749684.29
2. 0. 0.	315015.75	684984.25	3749902.32
2. 7.30.	303452.27	696547.73	3750134.43
2.15. 0.	291888.43	708111.57	3750380.63
2.22.30.	280324.22	719675.78	3750640.93
2.30. 0.	268759.60	731240.40	3750915.32
2.37.30.	257194.57	742805.43	3751203.81
2.45. 0.	245629.10	754370.90	3751506.41
2.52.30.	234063.16	765936.84	3751823.12
3. 0. 0.	222496.74	777503.26	3752153.94

LATITUDE

34. 0. 0.

0. 0. 0.	500000.00	500000.00	3761961.53
0. 7.30.	488456.26	511543.74	3761968.57
0.15. 0.	476912.49	523087.51	3761989.69
0.22.30.	465368.69	534631.31	3762024.90
0.30. 0.	453824.82	546175.18	3762074.19
0.37.30.	442280.87	557719.13	3762137.57
0.45. 0.	430736.82	569263.18	3762215.03
0.52.30.	419192.64	580807.36	3762306.58
1. 0. 0.	407643.32	592351.68	3762412.22
1. 7.30.	396103.83	603896.17	3762531.95
1.15. 0.	384559.15	615440.85	3762665.77
1.22.30.	373014.27	626985.73	3762813.68
1.30. 0.	361469.15	638530.85	3762975.69
1.37.30.	349923.79	650076.21	3763151.79
1.45. 0.	338378.16	661621.84	3763342.00
1.52.30.	326832.24	673167.76	3763546.31
2. 0. 0.	315286.01	684713.99	3763764.73
2. 7.30.	303739.44	696260.56	3763997.26
2.15. 0.	292192.53	707807.47	3764243.90
2.22.30.	280645.24	719354.76	3764504.66
2.30. 0.	269097.55	730902.45	3764779.54
2.37.30.	257549.45	742450.55	3765068.54
2.45. 0.	246000.92	753999.08	3765371.68
2.52.30.	234451.93	765548.07	3765688.95
3. 0. 0.	222902.46	777097.54	3766020.36

LATITUDE

34. 7.30.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3775821.02
0. 7.30.	488473.19	511526.81	3775828.07
0.15. 0.	476946.37	523053.63	3775849.24
0.22.30.	465419.50	534580.50	3775884.51
0.30. 0.	453892.57	546107.43	3775933.88
0.37.30.	442365.56	557634.44	3775997.37
0.45. 0.	430838.44	569161.56	3776074.97
0.52.30.	419311.20	580688.80	3776166.68
1. 0. 0.	407783.82	592216.18	3776272.51
1. 7.30.	396256.28	603743.72	3776392.44
1.15. 0.	384728.55	615271.45	3776526.50
1.22.30.	373200.61	626799.39	3776674.67
1.30. 0.	361672.45	638327.55	3776836.96
1.37.30.	350144.05	649855.95	3777013.38
1.45. 0.	338615.38	661384.62	3777203.92
1.52.30.	327086.42	672913.58	3777408.59
2. 0. 0.	315557.15	684442.85	3777627.39
2. 7.30.	304027.55	695972.45	3777860.33
2.15. 0.	292497.61	707502.39	3778107.41
2.22.30.	280967.30	719032.70	3778368.62
2.30. 0.	269436.60	730563.40	3778643.99
2.37.30.	257905.49	742094.51	3778933.50
2.45. 0.	246373.95	753626.05	3779237.17
2.52.30.	234841.96	765158.04	3779554.99
3. 0. 0.	223309.50	776690.50	3779886.98

LATITUDE

34.15. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3789680.80
0. 7.30.	488490.18	511509.82	3789687.86
0.15. 0.	476980.35	523019.65	3789709.06
0.22.30.	465470.47	534529.53	3789744.39
0.30. 0.	453960.53	546039.47	3789793.86
0.37.30.	442450.51	557549.49	3789857.46
0.45. 0.	430940.39	569059.61	3789935.19
0.52.30.	419430.15	580569.85	3790027.06
1. 0. 0.	407919.77	592080.23	3790133.07
1. 7.30.	396409.22	603590.78	3790253.22
1.15. 0.	384898.49	615101.51	3790387.50
1.22.30.	373387.56	626612.44	3790535.93
1.30. 0.	361876.41	638123.59	3790698.51
1.37.30.	350365.02	649634.98	3790875.23
1.45. 0.	338853.36	661146.64	3791066.10
1.52.30.	327341.42	672658.58	3791271.13
2. 0. 0.	315829.17	684170.83	3791490.31
2. 7.30.	304316.60	695683.40	3791723.65
2.15. 0.	292803.69	707196.31	3791971.16
2.22.30.	281290.41	718709.59	3792232.83
2.30. 0.	269776.75	730223.25	3792508.67
2.37.30.	258262.68	741737.32	3792798.68
2.45. 0.	246748.19	753251.81	3793102.88
2.52.30.	235233.25	764766.75	3793421.25
3. 0. 0.	223717.85	776282.15	3793753.82

LATITUDE

34.22.30.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3803540.86
0. 7.30.	488507.23	511492.77	3803547.94
0.15. 0.	477014.44	522985.56	3803569.18
0.22.30.	465521.61	534478.39	3803604.57
0.30. 0.	454028.72	545971.28	3803654.12
0.37.30.	442535.74	557464.26	3803717.83
0.45. 0.	431042.67	568957.33	3803795.69
0.52.30.	419549.48	580450.52	3803887.72
1. 0. 0.	408056.15	591943.85	3803993.91
1. 7.30.	396562.66	603437.34	3804114.26
1.15. 0.	385068.99	614931.01	3804248.78
1.22.30.	373575.12	626424.88	3804397.46
1.30. 0.	362081.03	637918.97	3804560.32
1.37.30.	350586.70	649413.30	3804737.34
1.45. 0.	339092.11	660907.89	3804928.54
1.52.30.	327597.24	672402.76	3805133.92
2. 0. 0.	316102.07	683897.93	3805353.48
2. 7.30.	304606.58	695393.42	3805587.22
2.15. 0.	293110.75	706889.25	3805835.15
2.22.30.	281614.56	718385.44	3806097.27
2.30. 0.	270117.99	729882.01	3806373.58
2.37.30.	258621.02	741378.98	3806664.09
2.45. 0.	247123.64	752876.36	3806968.81
2.52.30.	235625.81	764374.19	3807287.73
3. 0. 0.	224127.52	775872.48	3807620.86

LATITUDE

34.30. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3817401.22
0. 7.30.	488524.33	511475.67	3817408.31
0.15. 0.	477048.64	522951.36	3817429.58
0.22.30.	465572.91	534427.09	3817465.03
0.30. 0.	454097.12	545902.88	3817514.66
0.37.30.	442621.25	557378.75	3817578.48
0.45. 0.	431145.28	568854.72	3817656.48
0.52.30.	419669.20	580330.80	3817746.66
1. 0. 0.	408192.97	591807.03	3817855.03
1. 7.30.	396716.59	603283.41	3817975.59
1.15. 0.	385240.03	614759.97	3818110.33
1.22.30.	373763.28	626236.72	3818259.27
1.30. 0.	362286.30	637713.70	3818422.40
1.37.30.	350809.09	649190.91	3818599.72
1.45. 0.	339331.63	660668.37	3818791.25
1.52.30.	327853.88	672146.12	3818996.97
2. 0. 0.	316375.84	683624.16	3819216.90
2. 7.30.	304897.49	695102.51	3819451.04
2.15. 0.	293418.80	706581.20	3819699.38
2.22.30.	281939.75	718060.25	3819961.94
2.30. 0.	270460.33	729539.67	3820238.72
2.37.30.	258980.52	741019.48	3820529.73
2.45. 0.	247500.29	752499.71	3820834.96
2.52.30.	236019.63	763980.37	3821154.42
3. 0. 0.	224538.51	775461.49	3821466.11

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
	LATITUDE 34.37.30.		
0. 0. 0.	500000.00	500000.00	3831261.85
0. 7.30.	488541.48	511458.52	3831268.96
0.15. 0.	477082.95	522917.05	3831290.26
0.22.30.	465624.37	534375.63	3831325.77
0.30. 0.	454165.74	545834.26	3831375.49
0.37.30.	442707.03	557292.97	3831439.41
0.45. 0.	431248.22	568751.78	3831517.54
0.52.30.	419789.30	580210.70	3831609.88
1. 0. 0.	408330.24	591669.76	3831716.43
1. 7.30.	396871.02	603128.98	3831837.18
1.15. 0.	385411.62	614588.38	3831972.16
1.22.30.	373952.04	626047.96	3832121.34
1.30. 0.	362492.23	637507.77	3832284.74
1.37.30.	351032.20	648967.80	3832462.36
1.45. 0.	339571.91	660428.09	3832654.21
1.52.30.	328111.35	671888.65	3832860.28
2. 0. 0.	316650.49	683349.51	3833080.57
2. 7.30.	305189.33	694810.67	3833315.10
2.15. 0.	293727.83	706272.17	3833563.86
2.22.30.	282265.98	717734.02	3833826.86
2.30. 0.	270803.77	729196.23	3834104.10
2.37.30.	259341.16	740658.84	3834395.59
2.45. 0.	247878.14	752121.86	3834701.33
2.52.30.	236414.70	763585.30	3835021.32
3. 0. 0.	224950.81	775049.19	3835355.58
	LATITUDE 34.45. 0.		
0. 0. 0.	500000.00	500000.00	3845122.78
0. 7.30.	488558.69	511441.31	3845129.90
0.15. 0.	477117.37	522882.63	3845151.24
0.22.30.	465676.00	534324.00	3845186.81
0.30. 0.	454234.58	545765.42	3845236.61
0.37.30.	442793.08	557206.92	3845300.63
0.45. 0.	431351.49	568648.51	3845378.89
0.52.30.	419909.78	580090.22	3845471.38
1. 0. 0.	408467.93	591532.07	3845578.10
1. 7.30.	397025.93	602974.07	3845699.06
1.15. 0.	385583.76	614416.24	3845834.25
1.22.30.	374141.40	625858.60	3845983.69
1.30. 0.	362698.82	637301.18	3846147.36
1.37.30.	351256.01	648743.99	3846325.27
1.45. 0.	339812.96	660187.04	3846517.43
1.52.30.	328369.63	671630.37	3846723.84
2. 0. 0.	316926.02	683073.98	3846944.50
2. 7.30.	305482.10	694517.90	3847179.41
2.15. 0.	294037.85	705962.15	3847428.58
2.22.30.	282593.25	717406.75	3847692.02
2.30. 0.	271148.29	728851.71	3847964.72
2.37.30.	259702.95	740297.05	3848261.68
2.45. 0.	248257.20	751742.80	3848567.93
2.52.30.	236811.03	763188.97	3848888.44
3. 0. 0.	225364.42	774635.58	3849223.25

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING

LATITUDE

34.52.30.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3858984.00
0. 7.30.	488575.96	511424.04	3858991.12
0.15. 0.	477151.90	522848.10	3859[illegible]12.50
0.22.30.	465727.80	534272.20	3859048.13
0.30. 0.	454303.64	545696.36	3859098.01
0.37.30.	442879.41	557120.59	3859162.14
0.45. 0.	431455.08	568544.92	3859240.52
0.52.30.	420030.64	579969.36	3859333.16
1. 0. 0.	408606.07	591393.93	3859440.06
1. 7.30.	397181.34	602818.66	3859561.21
1.15. 0.	385756.44	614243.56	3859696.63
1.22.30.	374331.36	625668.64	3859846.30
1.30. 0.	362906.06	637093.94	3860010.24
1.37.30.	351480.54	648519.46	3860188.44
1.45. 0.	340054.77	659945.23	3860380.92
1.52.30.	328628.73	671371.27	3860587.66
2. 0. 0.	317202.42	682797.58	3860808.68
2. 7.30.	305775.79	694224.21	3861043.97
2.15. 0.	294348.85	705651.15	3861293.55
2.22.30.	282921.56	717078.44	3861557.41
2.30. 0.	271493.91	728506.09	3861835.56
2.37.30.	260065.88	739934.12	3862128.00
2.45. 0.	248637.46	751362.54	3862434.74
2.52.30.	237208.62	762791.38	3862755.78
3. 0. 0.	225779.34	774220.66	3863091.13

LATITUDE

35. 0. 0.

DELTA LONG.	E(WEST OF CM)	E(EAST OF CM)	NORTHING
0. 0. 0.	500000.00	500000.00	3872845.50
0. 7.30.	488593.28	511406.72	3872852.64
0.15. 0.	477186.53	522813.47	3872874.05
0.22.30.	465779.75	534220.25	3872909.73
0.30. 0.	454372.92	545627.08	3872959.69
0.37.30.	442966.01	557033.99	3873023.93
0.45. 0.	431559.00	568441.00	3873102.44
0.52.30.	420151.88	579848.12	3873195.23
1. 0. 0.	408744.64	591255.36	3873302.30
1. 7.30.	397337.24	602662.76	3873423.65
1.15. 0.	385929.67	614070.33	3873559.28
1.22.30.	374521.92	625478.08	3873709.19
1.30. 0.	363113.96	636886.04	3873873.39
1.37.30.	351705.77	648294.23	3874051.88
1.45. 0.	340297.35	659702.65	3874244.66
1.52.30.	328888.66	671111.34	3874451.74
2. 0. 0.	317479.68	682520.32	3874673.11
2. 7.30.	306070.41	693929.59	3874908.79
2.15. 0.	294660.83	705339.17	3875158.76
2.22.30.	283250.90	716749.10	3875423.05
2.30. 0.	271840.62	728159.38	3875701.64
2.37.30.	260429.96	739570.04	3875994.55
2.45. 0.	249018.92	750981.08	3876301.78
2.52.30.	237607.46	762392.54	3876623.34
3. 0. 0.	226195.57	773804.43	3876959.22

C.3

Appendix C
Encoding Forms

One Digit Encoding Form - Alabama Resources Information System

Encoding Identification

Agency ______________

Name ______________

Variable Id. ______________

Subarea ______________

Date ________ 19 ____ Sheet ____ of ____

Cell size

☐ .5 Kilometer (61.78 acres)

☐ .25 Kilometer (15.44 acres)

UTM Coordinates

1st row ______________

1st column ______________

INDENTIFICATION INFORMATION

PROJECT					VARIABLE				MISC.				
61	62	63	64	65	66	67	68	69	70	71	72	73	74
X													X

MAP COLUMN NUMBER

1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0

CARD COLUMN 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

MAP ROW NUMBER 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0

CARD NUMBER

75 76 77 78 79 80

ALABAMA DEVELOPMENT OFFICE STATE PLANNING DIV. REV. JAN. 1976

(REDUCED IN SIZE)

Two Digit Encoding Form - Alabama Resources Information System

Encoding Identification

Agency ____________________

Name ____________________

Variable Id. ____________________

Subarea ____________________

Date ______ 19 ____ Sheet ____ of ____

Cell size

.5 Kilometer (61.78 acres)

.25 Kilometer (15.44 acres)

UTM Coordinates

1st row ____________________

1st column ____________________

INDENTIFICATION INFORMATION													
	PROJECT				VARIABLE				MISC.				
61	62	63	64	65	66	67	68	69	70	71	72	73	74

MAP COLUMN NUMBER

1 2 3 4 5 6 7 8 9 — 0 1 2 3 4 5 6 7 8 9 — 0 1 2 3 4 5 6 7 8 9 — 0

CARD COLUMN 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

MAP ROW NUMBER

1 2 3 4 5 6 7 8 9 — 0 1 2 3 4 5 6 7 8 9 — 0 1 2 3 4 5 6 7 8 9 — 0

CARD NUMBER

75 76 77 78 79 80

ALABAMA DEVELOPMENT OFFICE STATE PLANNING DIV. REV. JAN. 1976

(REDUCED IN SIZE)

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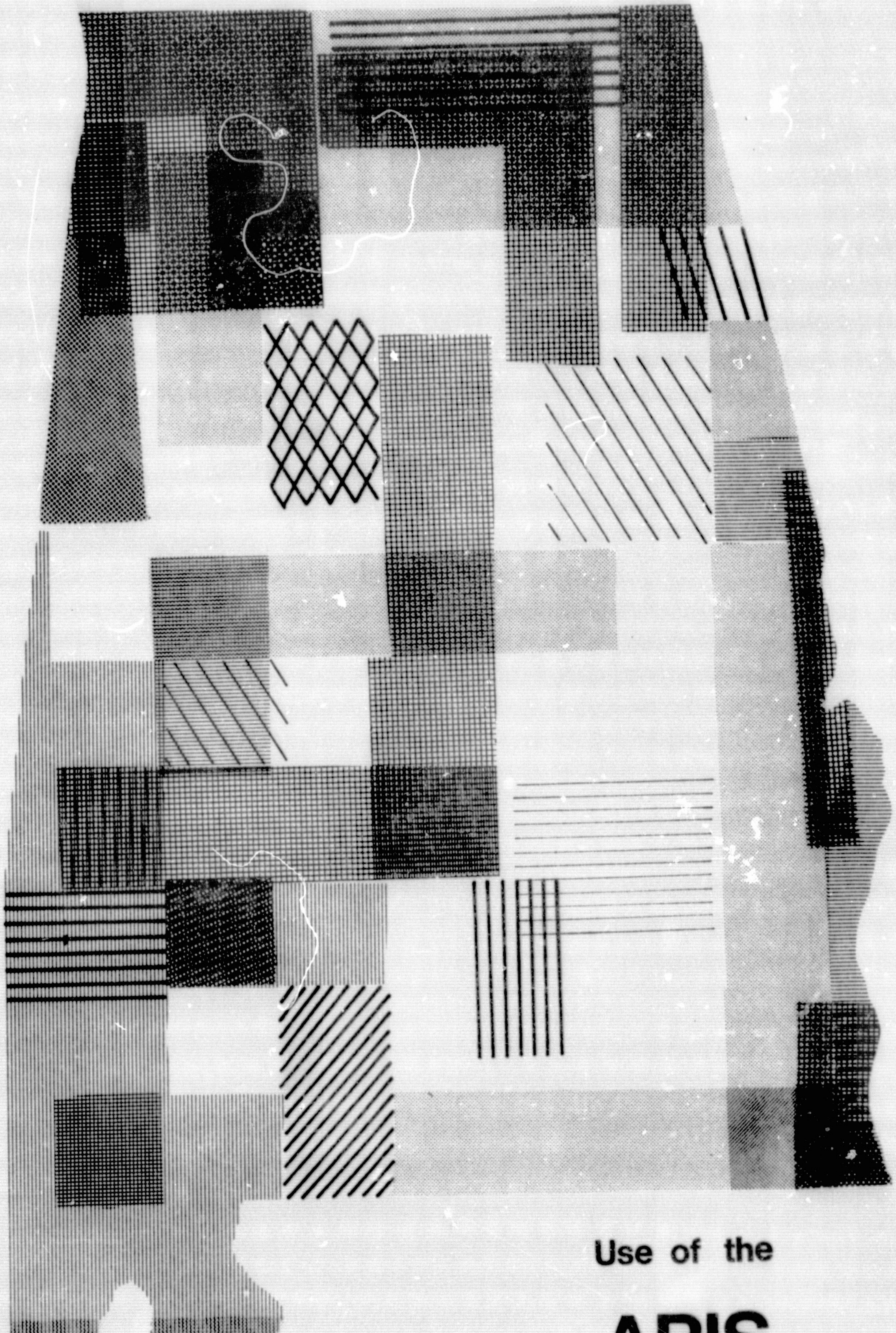

Use of the

ARIS

ALABAMA RESOURCES INFORMATION SYSTEM

Census Data Base

Use of the

ARIS

Census Data Base

ALABAMA RESOURCES INFORMATION SYSTEM

DEVELOPED BY

AUBURN UNIVERSITY

UNDER CONTRACT WITH

NATIONAL AERONAUTICS & SPACE ADMINISTRATION

Contract NAS8-30654

ALABAMA DEVELOPMENT OFFICE

ALA-AU-X996-1000-6

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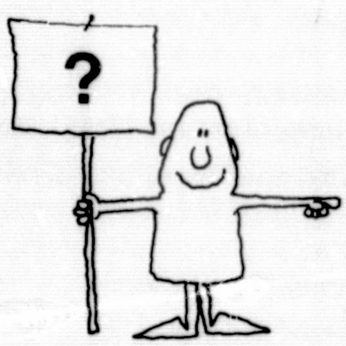
PREFACE

This booklet, one in the series of ARIS publications, has been written to guide the system user in accessing and using the census data bases incorporated into ARIS. For an overview of the ARIS system and its purpose, the reader is invited to read the booklet "An Introduction to ARIS", copies of which are available from the State Planning Division of the Alabama Development Office.

Two separate types of data, population and housing, comprise the ARIS census data base. Both are minor reconfigurations of the U.S. Bureau of the Census 1970 U.S. Census Fourth Count Summary (Population and Housing) for the State of Alabama. The processing software described in this booklet is based on the Bureau of the Census DAUList program packages with respect to the general configuration of the available output tables and their respective headings. DAUList is based on the computer language COBOL while ARISCENS utilizes the PL/1 computer language and ISAM (indexed sequential access method) data files.

For a complete description of the data base content and the structure of the available output tables, the user is encouraged to acquire copies of the Bureau of the Census publications "1970 Census Users' Guide" (parts I and II), "DAUList 4 Housing", and "DAUList 4 Population".

This booklet replaces the draft manual "CENSus-LISTer (CENSLIST) User's Manual" issued in July 1975. The contents of that manual have been incorporated as necessary into this publication.



INQUIRIES RELATIVE TO ARIS SHOULD BE DIRECTED TO THE ALABAMA DEVELOPMENT OFFICE, STATE PLANNING DIVISION, MONTGOMERY, ALABAMA

TABLE OF CONTENTS

Census Information Systems Concepts

CENSUS INFORMATION SYSTEMS CONCEPTS:

INTRODUCTION

The purpose of the ARISCENS software packages is to provide procedures for the retrieval of certain population and housing analysis information from the 1970 U.S. Census of Population and Housing, Fourth Count Summary. Information in the census summaries is structured into discrete tables at the relatively detailed level of the Census County Division (CCD)*. Manual analysis of information at this level of detail is very time consuming because of the mass of material. Appendix A to this manual contains maps showing the location of all Alabama CCD's.

---

*Census County Divisions. - Census County Divisions (CCD's) were established first in the State of Washington for use in the 1950 census. Between 1950 and 1960, they were established in 17 other States (including Alabama) and during the last decade, in three additional States. In reviewing the existing CCD's for the 1970 census, some revisions were made to improve their usefulness. For example, most of the counties which were a single division in 1960 were divided into two census county divisions to provide more detail.

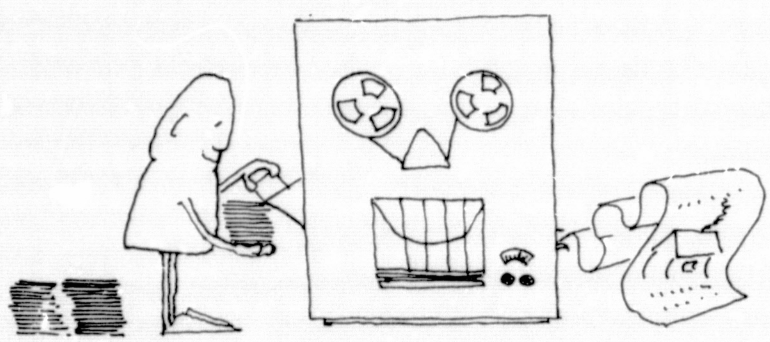
CCD's represent community areas which have been defined in recent decades by the Census Bureau with the cooperation of the Governors and State and local officials. In these States (21), the CCD's have replaced a variety of MCD's (Minor Civil Divisions) which were unsatisfactory for statistical purposes, principally because their boundaries frequently changed, were imaginary lines, or were not well known by many of the inhabitants. CCD's have relatively permanent boundaries which follow physical features or the limits of incorporated places. Where an unincorporated enclave exists within a city, it is included in the same CCD as the city. In establishing CCD's, consideration was given mainly to the trade or service areas of principal settlements and in some cases to major land use or physiographic differences. Each CCD has a name which is generally the name of the principal place listed within it, except in the State of Washington where most of the divisions are numbered rather than named. The data acquired from the Bureau of the Census for Alabama utilizes numbers rather than names for the various CCD's, even though all Alabama CCD's are named (see Appendix A). A table relating the Alabama CCD code numbers to the CCD names shown on the maps is included as Appendix B to this manual.

The ARISCENS software has been designed to reduce the quantity of information (discrete tables) handled by the analyst through the provision of summarizations over divisions larger than the CCD. In addition to the basic DAUList 4 provision of many discrete tables at the CCD level (called table building), ARISCENS permits both the aggregation of information from two or more census districts into a single table or table set (table aggregation) and a method to search through all census districts into a single table or table set (table aggregation) and a method to search through all census districts to determine those having certain requested attribute values equal to or greater than a specified target value (searches).

ARISCENS processing software utilizes the concept of request sets to access the several data bases. The request set function (table building, table aggregation, or search) is communicated by the presence of certain keywords in the user commands to the procedures. The bulk of this manual is devoted to examples of the structure of the request sets utilized to retrieve information from the data base(s).

BATCH PROCESSING

The version of the ARISCENS procedures presented in this manual is structured to operate in a batch processing mode (the batch or group of various jobs which have been read into the computer and awaiting processing by the computer on a priority basis determined by the computer resources of memory space, time, etc. required by each batched job) using sets of punched cards to transmit user commands for computer processing. This mode of processing was chosen because of the type of computer equipment available during the procedure design period of the project. When appropriate equipment becomes available and the ARIS II preprocessor becomes available, the ARISCENS procedures will be accessible through remote job entry terminals without the use of punched cards. The ARIS II user steps outlined beginning on page 23 of "An Introduction to ARIS" will be applicable to the ARISCENS procedures.

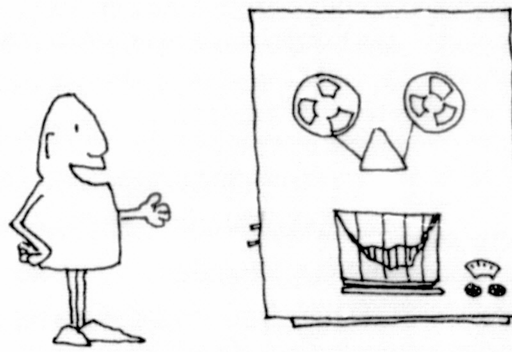


SYSTEM DOCUMENTATION

Full documentation of the ARISCENS computer procedures including program listings and flow diagrams are available from the State Planning Division of the Alabama Development Office. ARISCENS software is written using the Programming Language One (PL/1) computer language for use on large scale IBM computers. Without major programming change, system portability to equipment from other manufacturers is severely limited. Such limited portability is due to the significant differences in language implementations, computer word structures, and file handling procedures existing for computers of different manufacture.

JOB CONTROL LANGUAGE

Appendix C to this manual contains details related to the computer system control cards required for the execution of ARISCENS jobs. One of the functions of the ARIS II preprocessor noted earlier is to supply these items of information. Until activation of that preprocessor, certain job control language (JCL) entries must be prepared by the user. A rundown of the JCL cards used to process ARISCENS on Auburn University's IBM System 370/158 computer is included as Appendix C. An explanation of the content of each card is also included as an aid to user understanding and to facilitate system implementation on other IBM System 360/370 computers.



GENERAL INSTRUCTIONS

ARISCENS software consists of three primary procedures. The first, in order of necessary use, is concerned with entering the appropriate data base (housing or population) into the computer from offline storage. Continuous, on-line storage of ARIS data bases is not economically feasible. The census related data bases are especially large and would be extremely expensive to store on-line (computer accessible) continuously. The other procedures, CENSLIST and HOUSLIST, are the primary software used for performing table building, table aggregation, and searches on the population and housing data bases.

As noted, ARISCENS processing is accomplished through the use of request sets. Request sets can be of three types: table building, table aggregation, and search. Each submission of an ARISCENS job can contain as many different request sets as desired. Each request set must end with a semi-colon. Key word* values must be enclosed with single quote marks ('). When multiple values are specified for a key word, commas must be used as separators between the values. Once a key word is given a value(s), the value(s) is retained for all request sets until the kev word is respecified (in a given job submission). This retention exists for all key words except SEARCH and AGGREGATE. These latter are assumed to have the value 'NO' unless specifically given the value 'YES' in each request set. When neither of these latter key words are used in a request set, the table building function is performed. When AGGREGATE is given the value 'YES', table aggregation occurs and when SEARCH is set to 'YES', the search function is accomplished.

Separate divisions of this booklet are devoted to CENSLIST (population data base use) and HOUSLIST (housing data base functions). Examples given in the discussions on table building, table aggregation, and search for both the CENSLIST and HOUSLIST procedures should fully explain the key word concept and use. As a further aid, Appendix D contains a job deck listing and an example of the output display for several of the examples.

ERROR MESSAGES

Every effort has been made to anticipate user errors which may be made when structuring a request set. CENSLIST and HOUSLIST scans each request set prior to processing to assure the existence of a processable request. Request sets containing elements not recognized by the procedure will cause an error message to be returned to the user. Appendix E contains a listing of possible error messages along with the probably causes.

---

*Key words - The user of CENSLIST and HOUSLIST communicates the specifics of an information request by assigning values to certain key words. Illustrations of the use of the several key words is contained in the major divisions of this manual entitled CENSLIST and HOUSLIST.

SUPPRESSED DATA

On occasion, table building output will yield one or more negative one values. These are codes indicating suppressed data. Suppression occurred when samples were too small to insure the confidential nature of the census material. In the population data base (CENSLIST) suppression is related to entire tables rather than individual items. Should an attempt be made to list one of these tables, a message indicating suppressed data will be printed. If an aggregation includes suppressed data, no summation is made and the identification (county, CCD, record type) of the suppressed record is listed. The user can then resubmit the aggregation request set (if desired) without the suppressed record. Suppression in the housing data base (HOUSLIST) was handled differently by the Bureau of the Census, hence suppression is handled differently by HOUSLIST as compared with CENSLIST. HOUSLIST suppression is discussed in that section of this manual.

Procedures for Activating the ARISCENS Software and Data Bases

PROCEDURES FOR ACTIVATING THE ARISCENS SOFTWARE AND DATA BASES

It is expected that the ARISCENS portion of ARIS will be used only periodically; as opposed to daily use. In the interest of cost control, the entire ARISCENS package (software and data) is stored off-line on magnetic tape. This reel of tape (and others which serve as duplicate, backup units) contains five (5) files. These files and their functions are as follows:

File 1. The complete set of census data bases in an ISAM (indexed sequential access method) storage structure. It is keyed (ordered) on the values of the key words COUNTY, CCD, and RECORD-TYPE. This is a very large file typically requiring approximately 100 cylinders (1900 tracks) of IBM 3330 disc storage. This is a very large and expensive file to store on-line.

File 2. This is the second ISAM file and contains the DAUList 4 table headings. These are keyed on the values of the key word TABLE.

File 3. This is another ISAM file and contains the headings for the search function. They are keyed on the values of the key word CHARACTERISTIC.

File 4. This file contains a compiled copy of the ARISCENS software.

File 5. This file contains a source (uncompiled) copy of the ARISCENS software. It is used if the compiled procedures will not load because of an operating system change or implementation on a different computer.

File 6. This file contains the source program used to build File 1.

File 7. This file contains the source program(s) used to build File 2.

(Files 6 and 7 are included for completeness.)

Following are listings of job control language instructions which are used to load the CENSLIST and HOUSLIST data bases and software into the computer's on-line storage. This must be performed prior to running any of the processing

jobs as included in Appendix D. The HOUSLIST loading operation is accomplished by:

```
//LOAD4BP JOB (IED13,9R), '9 R PAT', REGION=96K
/*JOBPARM TAPES=1,LINES=1K
//ONE EXEC PGM=IEHPROGM
//SYSPRINT DD SYSOUT=A
//WHAT DD DISP=OLD,UNIT=DISK,VOL=SER=USER02
//MORE DD DISP=OLD,UNIT=DISK,VOL=SER=USER03
//LAST DD DISP=OLD,UNIT=3330,VOL=SER=314159
//SYSIN DD *
         SCRATCH DSNAME=IED13.ISAM4BH,VOL=3330=314159,PURGE
         SCRATCH DSNAME=IED13.HEAD4BH,VOL=3330=USER02,PURGE
         SCRATCH DSNAME=IED13.CHEAD4BH,VOL=3330=USER02,PURGE
         SCRATCH DSNAME=IED13.HOUSLIB,VOL=3330=USER03,PURGE
         UNCATLG DSNAME=IED13.ISAM4BH
         UNCATLG DSNAME=IED13.HEAD4BH
         UNCATLG DSNAME=IED13.CHEAD4BH
         UNCATLG DSNAME=IED13.HOUSLIB
//*
//TWO EXEC PGM=IEBISAM,PARM=LOAD,REGION=96K
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSNAME=IED13.BKUP4BH,DISP=OLD,DCB=BUFNO=6,
//         VOL=(,RETAIN,SER=TP0515),UNIT=TAPE,LABEL=(1,SL)
//SYSUT2 DD DSNAME=IED13.ISAM4BH,DISP=(,CATLG),
//         UNIT=SYSDA,VOL=SER=314159,SPACE=(CYL,(135,1)),
//         LABEL=RETPD=7,DCB=(BUFNO=3,DSORG=IS)
//*
//THREE EXEC PGM=IEBISAM,PARM=LOAD,REGION=64K
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSNAME=IED13.BKUPHEAD,DISP=OLD,DCB=BUFNO=7,
//         VOL=(,RETAIN,REF=*.TWO.SYSUT1),LABEL=(2,SL)
//SYSUT2 DD DSNAME=IED13.HEAD4BH,DISP=(,CATLG),
//         UNIT=DISK,VOL=SER=USER02,SPACE=(CYL,(2)),
//         LABEL=EXPDT=79365,DCB=(BUFNO=11,DSORG=IS)
//*
//FOUR EXEC PGM=IEBISAM,PARM=LOAD,REGION=64K
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSNAME=IED13.BKUPCHD,DISP=OLD.DCB=BUFNO=10.
//         VOL=(,RETAIN,REF=*. TWO.SYSUTI),LABEL=(3,SL)
//SYSUT2 DD DSNAME=IED13.CHEAD4BH,DISP=(,CATLG),
//         UNIT=DISK,VOL=SER=USER02,SPACE=(CYL,(1)),
//         LABEL-EXPDT=79365,DCB=(BUFNO=80,DSORG=IS)
//*
//FIVE EXEC PGM=IEFBR14
//ALLOCATE DD DSNAME=IED13.HOUSLIB,DISP=(,CATLG),
//         UNIT=DISK,VOL=SER=USER03,
//         SPACE=(TRK,(5,1,1),RLSE),LABEL=EXPDT=79365
//*
//SIX EXEC PGM=IEHMOVE
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DISP=OLD,UNIT=DISK,VOL=SER=USER01
//SOURCE DD DISP=OLD,LABEL=(4,SL),VOL=(,RETAIN,REF=*.TWO.SYSUT1),
//         DCB=(RECFM=FB.LRECL=80,BLKSIZE=800)
//THERE DD DISP=OLD,UNIT=DISK,VOL=SER=USER03
//SYSIN DD *
         COPY PDS=IED13.HLIBKUP,TO=3330=USER03,                        X
               RENAME=IED13.HOUSLIB,FROMDD=SOURCE,                     X
               FROM=3400-3=(TP0515,4)
//
```

THE CENSLIST loading operation is accompanied by:

```
//LOAD4BH JOB (IED13,9R), '9 R PAT', REGION=96K
/*JOBPARM TAPES=1,LINES=1K
//ONE EXEC PGM=IEHPROGM
//SYSPRINT DD SYSOUT=A
//WHAT DD DISP=OLD,UNIT=DISK,VOL=SER=USER02
//MORE DD DISP=OLD,UNIT=DISK,VOL=SER=USER03
//LAST DD DISP=OLD,UNIT=3330,VOL=SER=314159
//SYSIN DD *
         SCRATCH DSNAME=IED13.ISAM4BP,VOL=3330=314159,PURGE
         UNCATLG DSNAME=IED13.ISAM4BP
         SCRATCH DSNAME=IED13.HEADINGS,VOL=3330=USER02,PURGE
         UNCATLG DSNAME=IED13.HEADINGS
         SCRATCH DSNAME=IED13.CHARHEAD,VOL=3330=USER02,PURGE
         UNCATLG DSNAME=IED13.CHARHEAD
         SCRATCH DSNAME=IED13.CENSLIB,VOL=3330=USER03,PURGE
         UNCATLG DSNAME=IED13.CENSLIB
//*
//TWO EXEC PGM=IEBISAM,PARM=LOAD,REGION=96K
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSNAME=IED13.ISAMBKUP,DISP=OLD,DCB=BUFNO=6,
//         VOL=(,RETAIN,SER=TP0743),UNIT=TAPE,LABEL=(1,SL)
//SYSUT2 DD DSNAME=IED13.ISAM4BP,DISP=(,CATLG),
//         UNIT=SYSDA,VOL=SER=314159,SPACE=(CYL,(95)),
//         LABEL=RETPD=7,DCB=(BUFNO=4,DSORG=IS)
//*
//THREE EXEC PGM=IEBISAM,PARM=LOAD,REGION=96K
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSNAME=IED13.THEAD,DISP=OLD,DCB=BUFNO=7,
//         VOL=(,RETAIN,REF=*.TWO.SYSUT1),LABEL=(2,SL)
//SYSUT2 DD DSNAME=IED13.HEADINGS,DISP=(,CATLG),
//         UNIT=DISK,VOL=SER=USER02,SPACE=(CYL,(2)),
//         LABEL=EXPDT=79365,DCB=(BUFNO=11,DSORG=IS)
//*
//FOUR EXEC PGM=IEBISAM,PARM=LOAD,REGION=96K
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSNAME=IED13.CHEAD,DISP=OLD,DCB=BUFNO=10,
//         VOL=(,RETAIN,REF=*.TWO.SYSUT1),LABEL=(3,SL)
//SYSUT2 DD DSNAME=IED13.CHARHEAD,DISP=(,CATLG),
//         UNIT=DISK,VOL=SER=USER02,SPACE=(CYL,(1)),
//         LABEL=EXPDT=79365,DCB=(BUFNO=80,DSORG=IS)
//*
//FIVE EXEC PGM=IEFBR14
//ALLOCATE DD DSNAME=IED13.CENSLIB,DISP=(,CATLG),
//         UNIT=DISK,VOL=SER=USER03,
//         SPACE=(TRK,(5,1,1),RLSE),LABEL=EXPDT=79365
//*
//SIX EXEC PGM=IEHMOVE
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DISP=OLD,UNIT=DISK,VOL=SER=USER01
//SOURCE DD DISP=OLD,LABEL=(4,SL),VOL=(,RETAIN,REF=*.TWO.SYSUT1),
//         DCB=(RECFM=FB,LRECL=80,BLKSIZE=800)
//THERE DD DISP=OLD,UNIT=DISK,VOL=SER=USER03
//SYSIN DD *                                                           X
         COPY PDS=IED13.CLIBKUP,TO=3330=USER03,                        X
               RENAME=IED13.CENSLIB,FROMDD=SOURCE,
               FROM=3400-3=(TP0743,4)
//
```

The job steps listed on preceding lines merely load and make ready CENSLIST and HOUSLIST for running user analysis jobs similar to those illustrated in Appendix D. The loading routines above do not generate tables or perform search tasks. The loading routines require approximately 30 seconds of computer time during a clock time period of less than 20 to 30 minutes. The cost of loading on Auburn University's computer is approximately $2.00. The daily cost to store these files on-line is approximately $10.00 per day (on the same computer). To aid in keeping costs minimal, run step one in the above jobs to remove all the datasets from disk (for convenience, these are repeated below).

```
//ONE EXEC PGM=IEHPROGM
//SYSPRINT DD SYSOUT=A
//WHAT DD DISP=OLD,UNIT=DISK,VOL=SER=USER02
//MORE DD DISP=OLD,UNIT=DISK,VOL=SER=USER03
//LAST DD DISP=OLD,UNIT=3330,VOL=SER=314159
//SYSIN DD *
         SCRATCH DSNAME=IED13.ISAM4BP,VOL=3330=314159,PURGE
         UNCATLG DSNAME=IED13.ISAM4BP
         SCRATCH DSNAME=IED13.HEADINGS,VOL=3330=USER02,PURGE
         UNCATLG DSNAME=IED13.HEADINGS
         SCRATCH DSNAME=IED13.CHARHEAD,VOL=3330=USER02,PURGE
         UNCATLG DSNAME=IED13.CHARHEAD
         SCRATCH DSNAME=IED13.CENSLIB,VOL=3330=USER03,PURGE
         UNCATLG DSNAME=IED13.CENSLIB
//*
```

```
//*
//ONE EXEC PGM=IEHPROGM
//SYSPRINT DD SYSOUT=A
//WHAT DD DISP=OLD,UNIT=DISK,VOL=SER=USER02
//MORE DD DISP=OLD,UNIT=DISK,VOL=SER=USER03
//LAST DD DISP=OLD,UNIT=3330,VOL=SER=314159
//SYSIN DD *
         SCRATCH DSNAME=IED13.ISAM4BH,VOL=3330=314159,PURGE
         SCRATCH DSNAME=IED13.HEAD4BH,VOL=3330=USER02,PURGE
         SCRATCH DSNAME=IED13.CHEAD4BH,VOL=3330=USER02,PURGE
         SCRATCH DSNAME=IED13.HOUSLIB,VOL=3330=USER03,PURGE
         UNCATLG DSNAME=IED13.ISAM4BH
         UNCATLG DSNAME=IED13.HEAD4BH
         UNCATLG DSNAME=IED13.CHEAD4BH
         UNCATLG DSNAME=IED13.HOUSLIB
//*
```

Procedures for using CENSLIST

PROCEDURES FOR USING CENSLIST

TABLE BUILDING

Each table is uniquely identified by the RECORD_TYPE for a given CCD and COUNTY. The census data contains ninety-nine (99) different tables for each of RECORD_TYPE's one, two, three, and four. There are an additional twenty-eight (28) tables for RECORD_TYPE thirteen. A complete description of all record types is contained in the federal publication entitled, 1970 CENSUS USERS'GUIDE, under fourth count population.

When attempting to build tables, four of the keywords must be given values. These keywords are COUNTY, CCD, RECORD_TYPE, and TABLES. The general form for providing values for the keywords is

```
     COUNTY = 'i{,j,k,...}'
     CCD    = 'i{,j,k,...}'
RECORD_TYPE= 'i{,j,k,...}'
     TABLES = 'i{,j,k,...}'
```

where i, j, k are integer numbers and brackets {} are indications of additional, but optional items. The brackets, themselves, are never included in the request set. All tables requested are generated for each COUNTY-CCD-RECORD_TYPE specified.

For example, to produce table 17 for county number 1 (Autauga), CCD number 5 and record type 1 (total population), one would specify a request set in the following manner:

```
COUNTY='1' CCD='5' RECORD_TYPE='1' TABLES='17';
```

This request set might be entered into a punched card as shown in figure 1. No specific format is required when punching a request set. The user may begin punching in card column number 1 or in any other column (e.g., column number 7 as shown in figure 1). No specific spacing is required between the keywords and their values. One blank space has been used between the keyword/value sets in figure 1 and other punched card illustrations in this section to improve user readability.

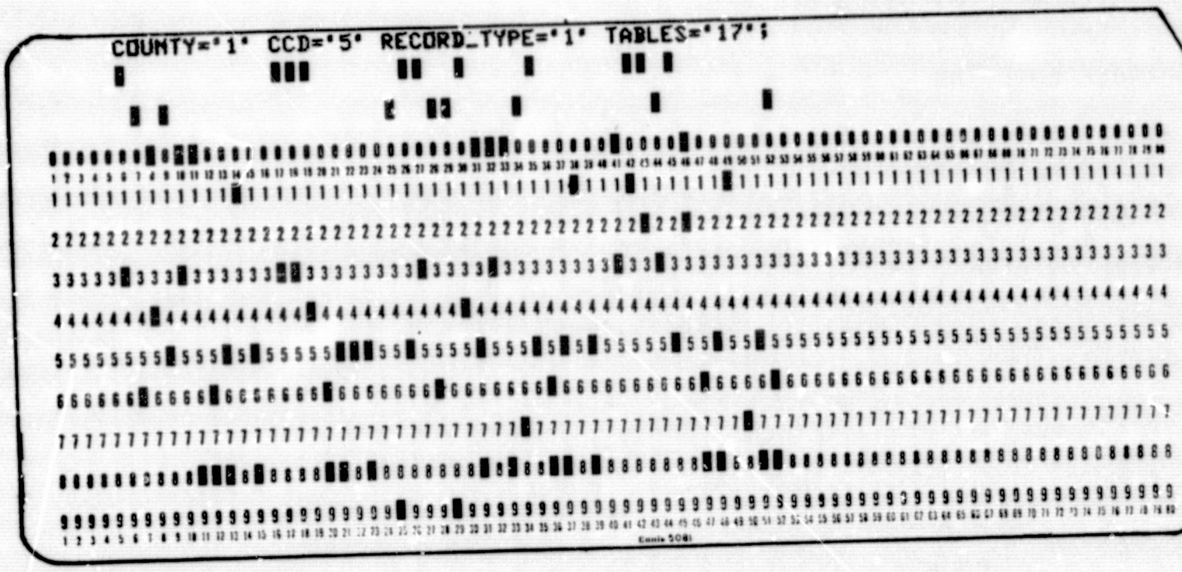


Figure 1

Other examples are:

To produce tables 17 and 78 for the above county and CCD, one would code:

COUNTY='1' CCD='5' RECORD_TYPE='1' TABLES='17,78';

To produce table 69 for county 1, CCD's 5 and 10, and record type 2, one would code;

COUNTY='1,1' CCD='5,10' RECORD_TYPE='2,2' TABLES='69';

Producing tables 1 thru 10 for county 1, CCD 5, RECORD_TYPE 1 and county 43, CCD 10, RECORD_TYPE 2 and county 39, CCD 15, RECORD_TYPE 4 would involve coding:

COUNTY='1,43,39' CCD='5,10,15' RECORD_TYPE='1,2,4'
TABLES='1,2,3,4,5,6,7,8,9,10';

Figure 2 illustrates this last example which utilizes more than one punched card. While the illustration in figure 2 does not contain any indenting for the second card in the request set, if it would improve the system's utility for a given analyst, the free format concept permits such.

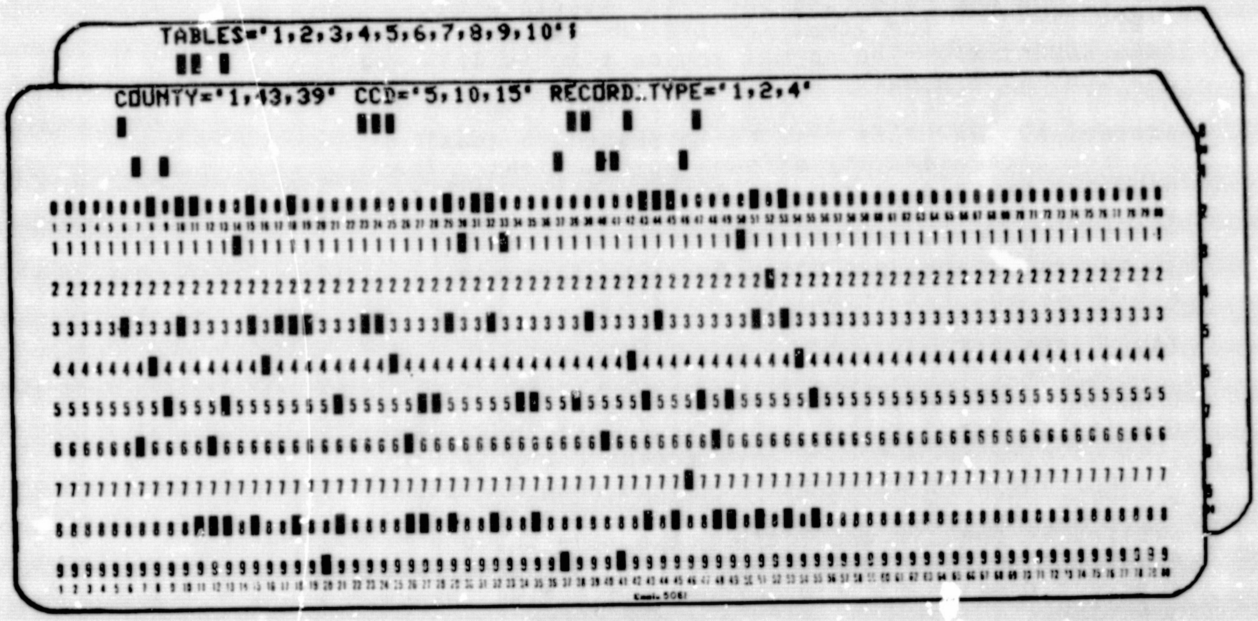


Figure 2

Since all keyword values (except AGGREGATE & SEARCH) are retained from one request set to another, the following request sets

COUNTY='22,19' CCD='5,5' RECORD_TYPE='4,4'

TABLES='6,7'; TABLES='40,50'; COUNTY='11,12';

would produce:

1. Tables 6 and 7 for county 22 census division 5 record type 4, and tables 6 and 7 for county 19 census division 5 record type 4.

2. Tables 40 and 50 for county 22 census division 5 record type 4, and tables 40 and 50 for county 19 census division 5 record type 4.

3. Tables 40 and 50 for county 11 census division 5 record type 4, and tables 40 and 50 for county 12 census division 5 record type 4.

Two items in the job control language (JCL) cards may require change if a large quantity of different COUNTY-CCD-RECORD_TYPE combinations are to be produced from a single request set. That item is in

the second JCL card (the one which starts with //ƀEXECƀ...). The items are REGION=yyyK and PARM= 'MAX_CCDS=xxx'. The normal region size is 128K and MAX_CCDS will usually be 50. If the number of combinations of counties, CCDs and record types exceeds 50, MAX_CCDs must be increased to equal or exceed the quantity of such combinations. The previous example of request sets contains only six (6) different combinations of COUNTY-CCD-RECORD_TYPES. For each 250 or portion thereof increase in the value assigned MAX_CCDs, also increase REGION by one (as from 128K to 129K).

TABLE AGGREGATION

CENSLIST will provide information summaries by displaying standard tables which represent an aggregation of data from two or more Census County Divisions. The only difference between request sets for table building and request sets for table aggregations is that in the latter case, the keyword AGGREGATE is given the value 'YES'. All other items are specified in the same manner, including the JCL considerations about REGION and MAX_CCDs.

For example, to obtain table 16 aggregated across two of the CCDs in Autauga County, the request set would be:

```
COUNTY='1,1' CCD='5,10' RECORD_TYPE='1,1'

TABLES='16' AGGREGATE='YES';
```

Figure 3 contains punched card samples illustrating this use of CENSLIST.

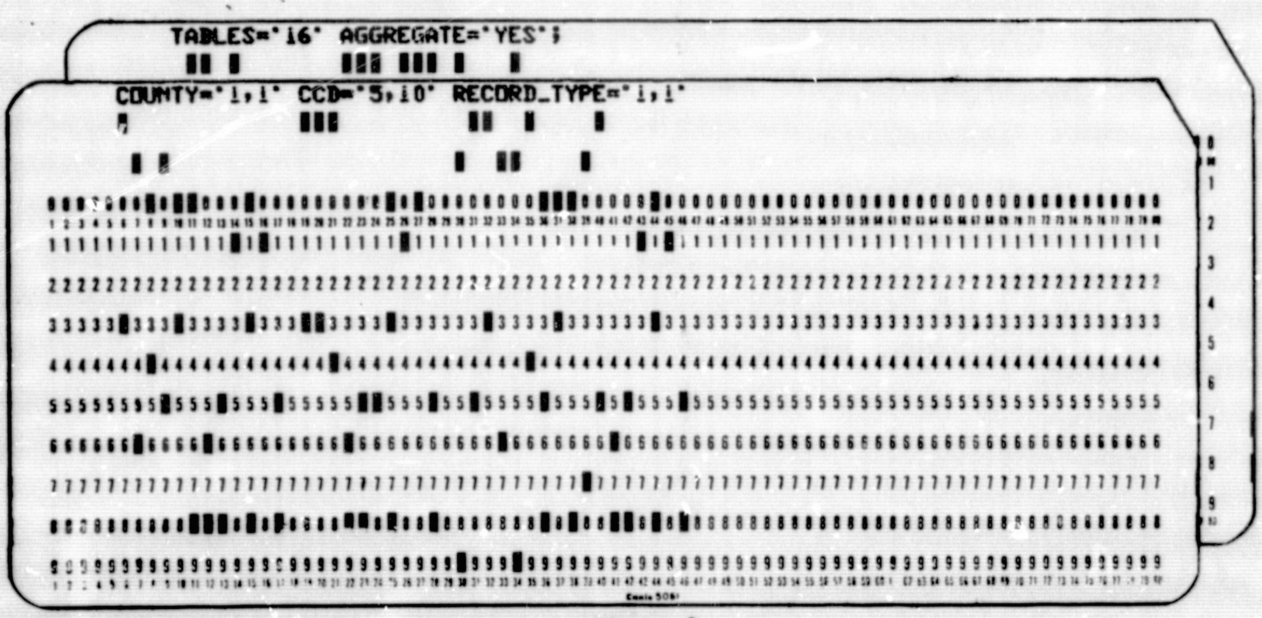


Figure 3

For acquisition of tables 78,98,66, and 14, with each aggregated across two of the CCDs in Autauga County, the request set might be:

```
COUNTY='1,1' CCD='5,10' RECORD_TYPE='1,1'

TABLES='78,98,66,14' AGGREGATE='YES';
```

Simultaneous acquisition of aggregated tables for both of the above examples could be acquired by either specifying (see figure 4)

```
COUNTY='1,1' CCD='5,10' RECORD_TYPE='1,1'

TABLES='16,78,98,66,14' AGGREGATE='YES'
```

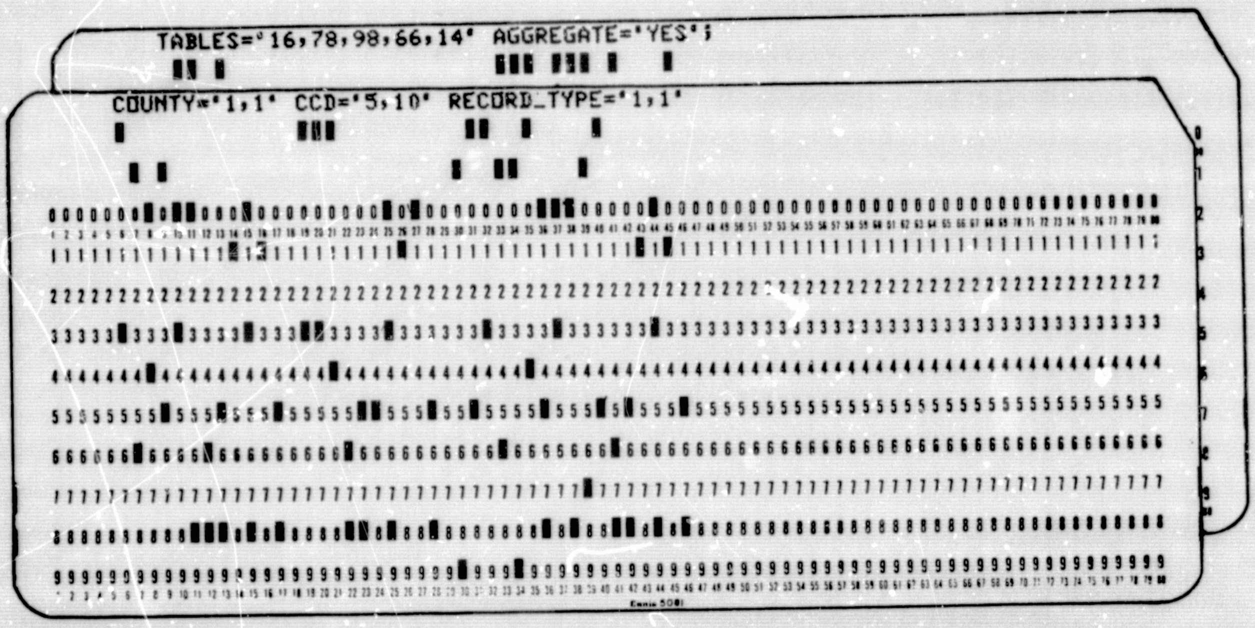


Figure 4

or by specifying (see figure 5)

```
COUNTY='1,1' CCD='5,10' RECORD_TYPE='1,1'

TABLES='16' AGGREGATE='YES'

TABLES='78,98,66,14' AGGREGATE='YES';
```

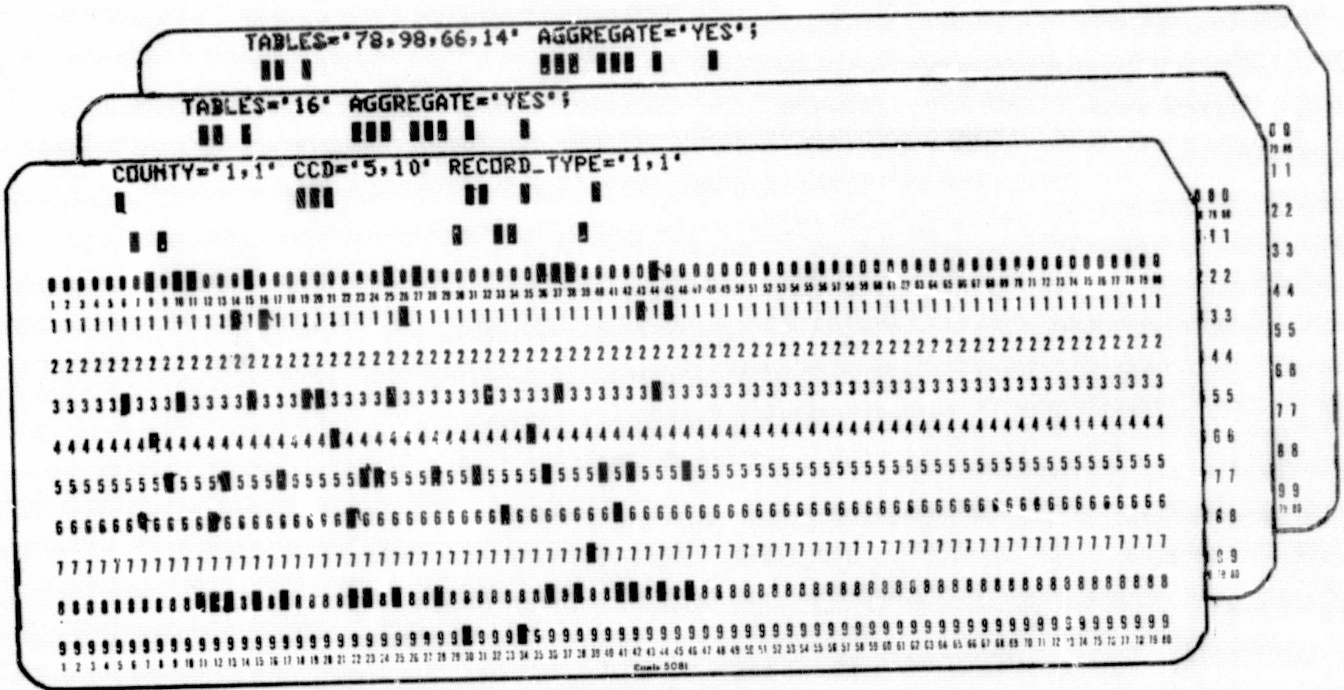


Figure 5

It should be noted the latter specification contains two request sets, whereas the former version contains only a single request set. When multiple request sets, each dealing with the aggregation function, are submitted for processing, the keyword AGGREGATE must be given the value 'YES' for each set.

SEARCHES

CENSLIST contains a searching procedure which permits the scanning of all census districts to find and list those having a specified population attribute with a value greater than or equal to some desired target level.

Three keywords: CHARACTERISTIC, LEVEL, and SEARCH must be given values and used in the request set to activate the search procedure. To initiate a search, the request set is structured:

```
CHARACTERISTIC='i,j' LEVEL='xxx.xx' SEARCH='YES'
```

wherein the ratio of characteristic i to characteristic j exceeding level xxx.xx is the criteria for deciding whether a particular county-CCD fulfills the target of the search. Appendix F contains a

listing of all characteristics which are recognized by CENSLIST. Any of the listed characteristic identification numbers can be used in place of the i in the general request set specification shown above. Likewise, any of the listed characteristic identification numbers would be used in place of the above j.

An example search request set which would find all county-CCDs in which persons 18 years of age or younger comprise 50% or more of the total population would be coded (see figure 6):

```
CHARACTERISTIC='1,32' LEVEL='50' SEARCH='YES';
```

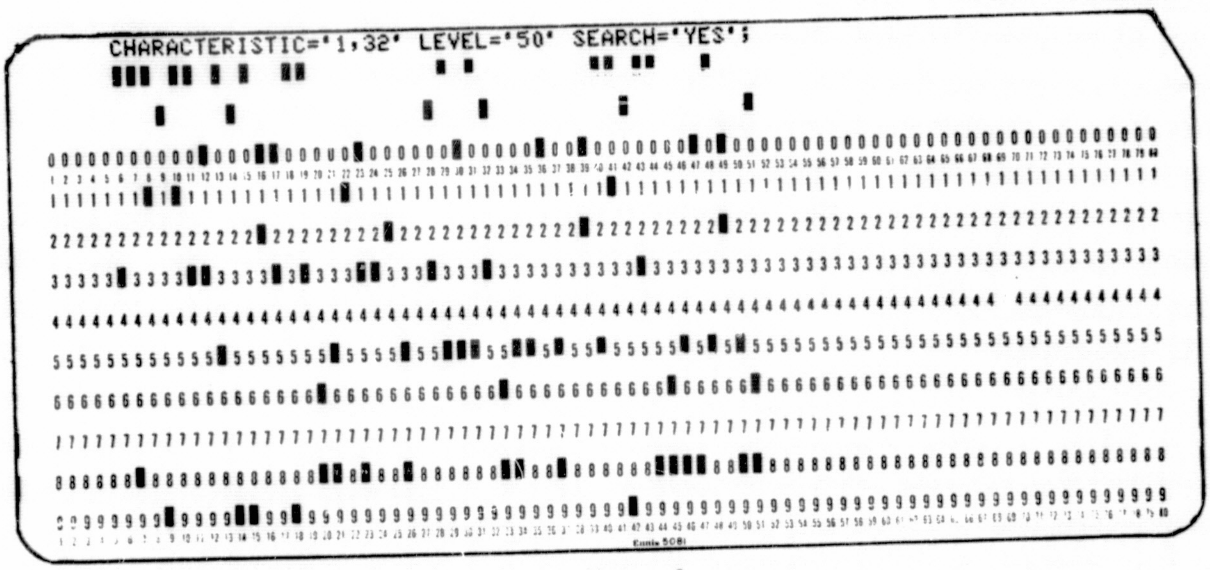


Figure 6

Procedures for using HOUSLIST

PROCEDURES FOR USING HOUSLIST

HOUSLIST procedures are very similar to those for CENSLIST outlined in an earlier section. The primary difference, from the user standpoint, lies in the more close table/record type arrangement of the housing data base as compared with the population data base. It will be recalled that ninety-nine(99) different population tables exist for each of four different record types. In the housing data base, groups of tables are tied to a single record type. The complete housing table/record type arrangement is:

Record Type	Tables
1	1- 40
2	41-107
7	108-119
8	120-130
9	131-152
10	153-200

In both the population and housing data base, the table/record type structure is as established by the Bureau of the Census. For further information and a description of all record types, the user is directed to the publication, 1970 CENSUS USERS' GUIDE, under fourth count housing.

All keywords introduced and explained in the section on CENSLIST are identically applicable with HOUSLIST. For review, the keywords and their structures are:

```
       COUNTY = 'i{,j,k,...}'

       CCD    = 'i{,j,k,...}'

  RECORD_TYPE= 'i{,j,k,...}'

       TABLES = 'i{,j,k,...}'

    AGGREGATE  = 'YES'

CHARACTERISTIC = 'i,j'

        LEVEL  = 'xxx.xx'

       SEARCH = 'YES'
```

where i, j, k are integer numbers, brackets {} are indications of additional, but optional items (the brackets, themselves, are never included in a request set), xxx.xx represents a percentage (as 33.3% is punched 33.3 or 50.0% is punched 50 or 50.0), and YES is used to cause a table aggregation or a search to be performed.

TABLE BUILDING

To produce table 12 (count of occupied and vacant year-round housing units with all plumbing facilities by tenure and race of head by heating equipment) for county number 49 (Mobile), CCD number 40 (Prichard), and record type number one (the only available), one would specify a request set in the following manner (also see figure 7):

COUNTY='49' CCD='40' RECORD_TYPE='1' TABLES='12';

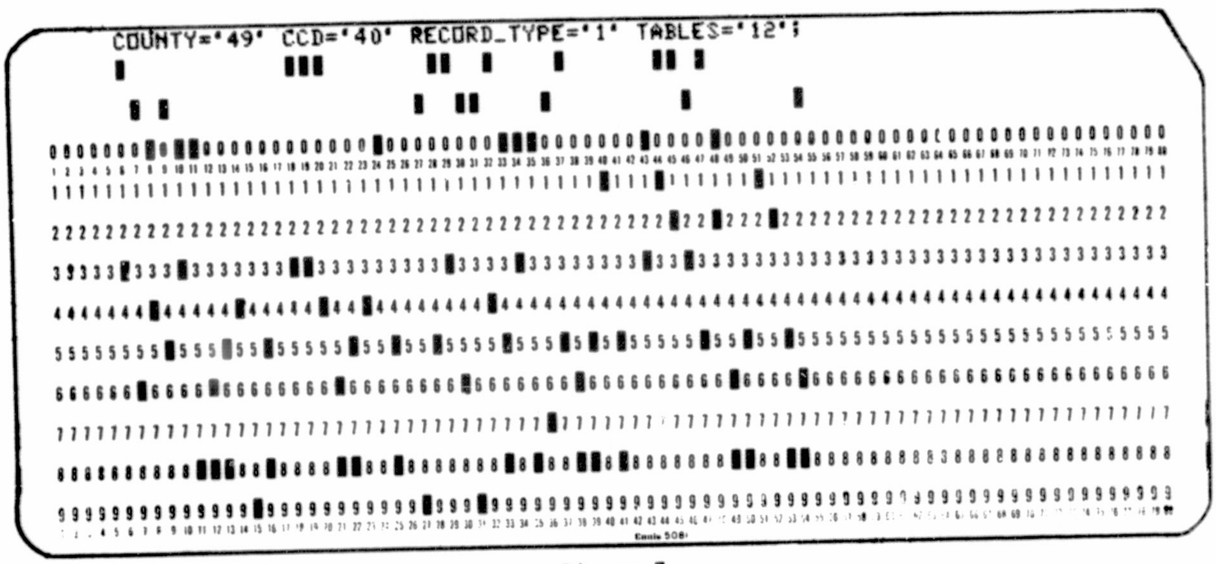


Figure 7

Other examples include:

Acquisition of tables 12 and 19 for the same county and CCD would involve the coding:

COUNTY='49' CCD='40 RECORD_TYPE='1' TABLES='12,19';

Production of tables 12 and 19 for the same county and CCD's 40 and 45 would result from the coding:

COUNTY='49,49' CCD='40,45' RECORD_TYPE='1,1'

TABLES='12,19';

Since all keyword values (except for AGGREGATE and SEARCH) are retained from one request set to the next, a large quantity of output can result from a small amount of request set coding (see CENSLIST). At the same time, improper code sets can yield unwanted output. The "KISS" principal (Keep It Simple Son) is applicable by using a separate request set for each table desired and is recommended.

TABLE AGGREGATION

HOUSLIST table aggregation functions in a manner identical to CENSLIST except for the table/record type modifications discussed earlier. The change from table building to table aggregation is accomplished by merely giving the value 'YES' to the keyword AGGREGATE.

For example, to obtain tables 12 and 19 aggregated across the adjacent CCD's of Prichard and Saraland in Mobile County, one would structure the request set as follows (see also figure 8):

```
COUNTY='49,49' CCD='40,45' RECORD_TYPE='1,1'
        TABLES='12' AGGREGATE='YES';

COUNTY='49,49' CCD='40,45' RECORD_TYPE='1,1'
        TABLES='19' AGGREGATE='YES';
```

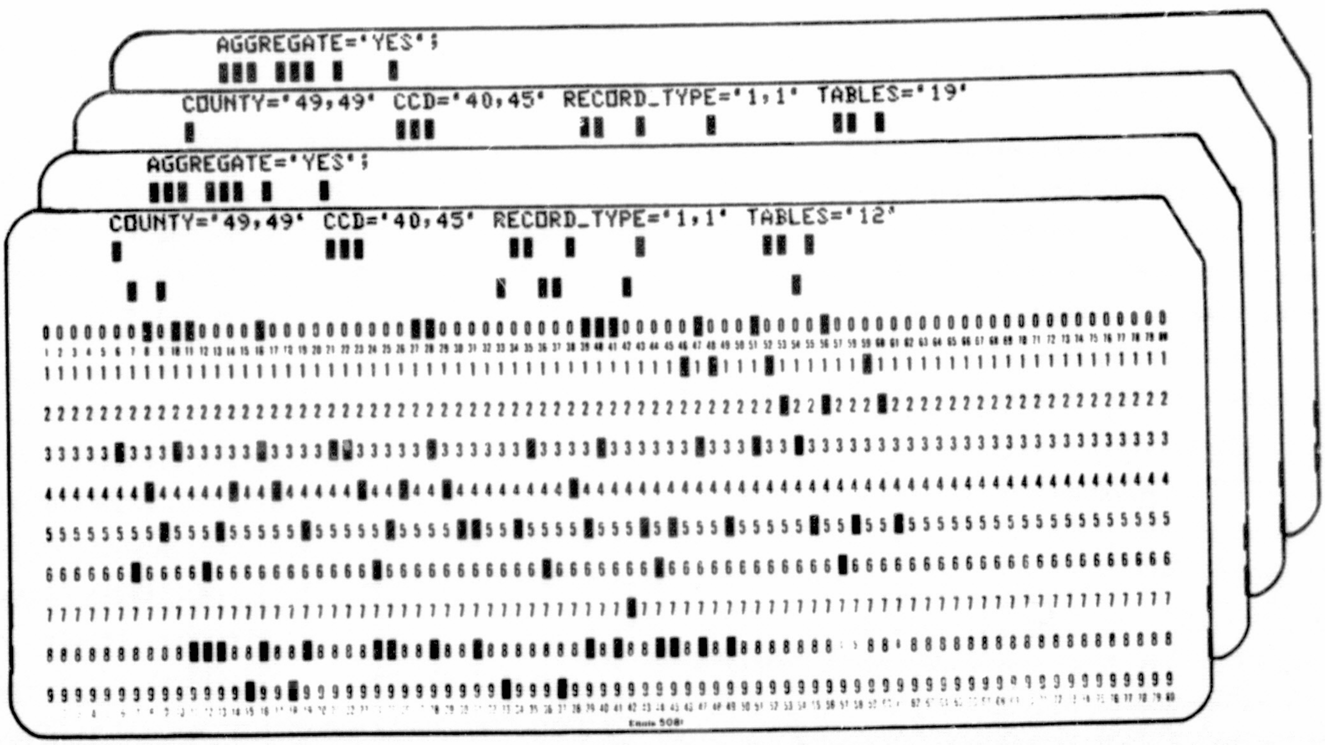


Figure 8

When aggregating various tables, the existence of data suppression becomes a serious problem. When negative data (suppressed) is encountered, incorrect tables are formed, but a message noting this fact is transmitted to the user in the output. When this is encountered, the user should obtain copies of the individual tables forming the aggregation to determine which sums are incorrect. This can readily be determined by noting which items contain the negative one value in the various separate tables. In general, because of the relatively small Spanish American population segment in Alabama, most data related to Spanish Americans has been suppressed by the Bureau of the Census.

SEARCHES

HOUSLIST and CENSLIST search procedures are essentially identical. The search characteristic codes differ and are listed in Appendix F. A sample HOUSLIST search request set to find all county-CCD's in which renter occupied housing lacking plumbing comprise 80% or more of the renter occupied housing would be coded (see figure 9):

```
CHARACTERISTIC='47,2' LEVEL='80' SEARCH='YES';
```

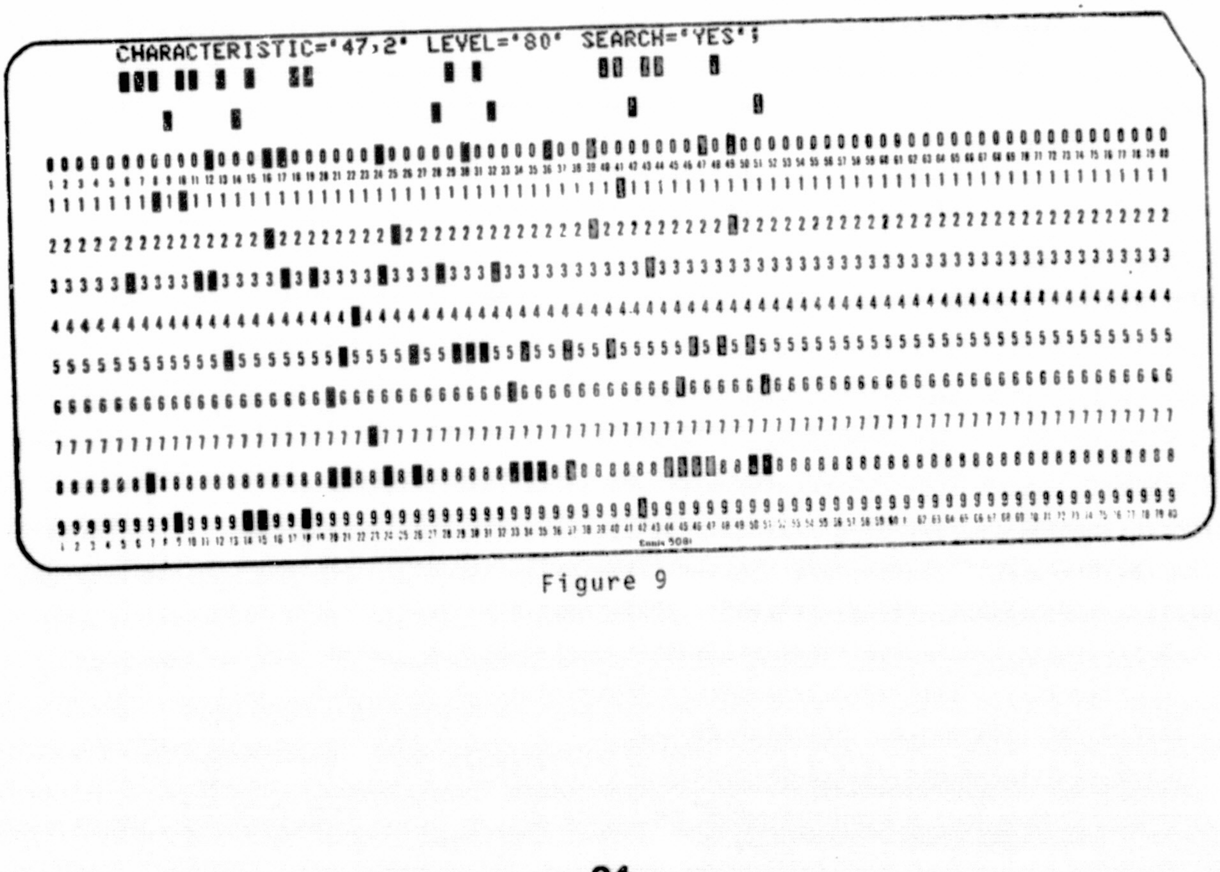


Figure 9

Appendix A
Alabama CCD Maps

<u>1970 Census of Population</u>: <u>Number of Inhabitants, Alabama</u>, U.S. Bureau of Census, Dept. of Commerce, July 1971.

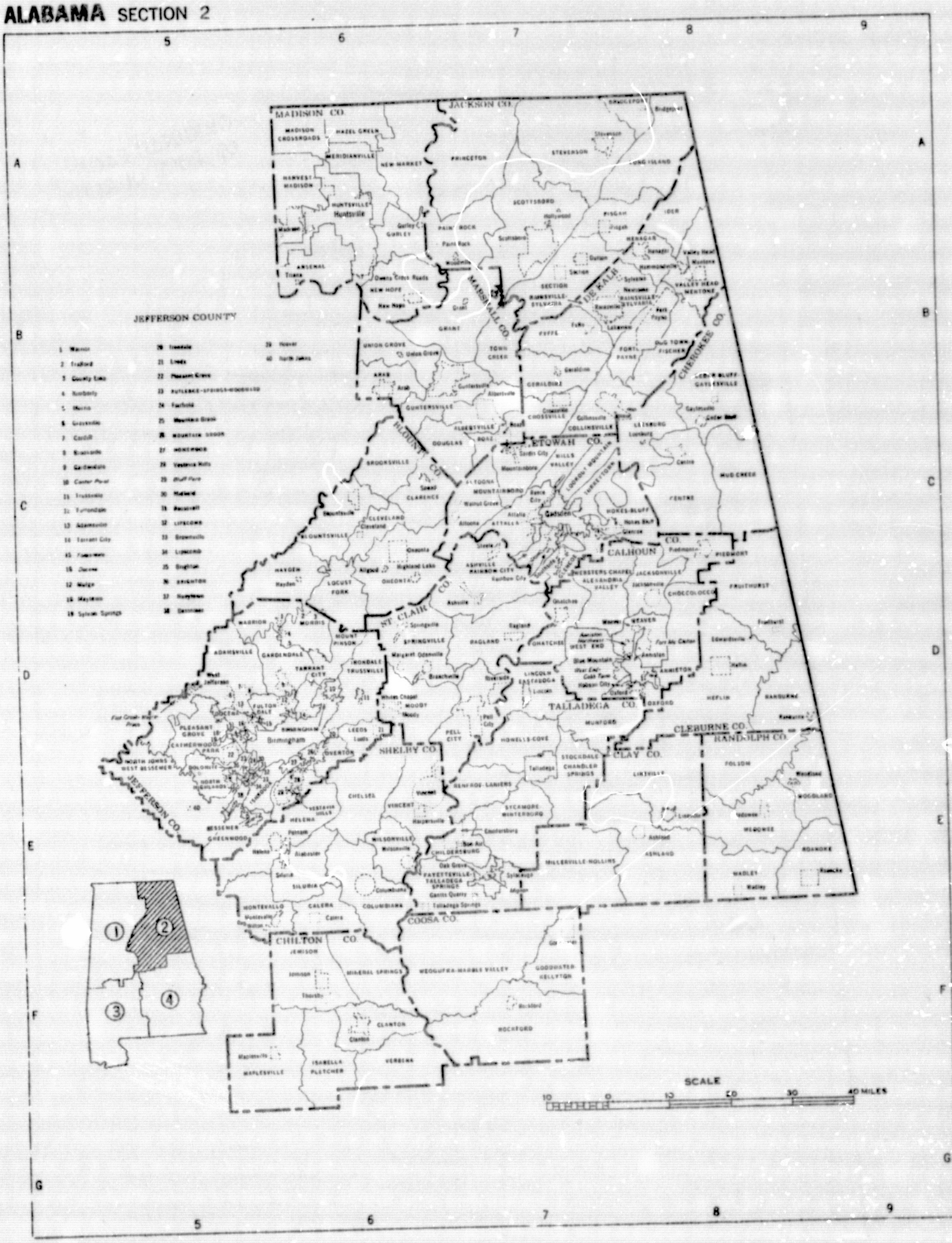
County Map Finding Guide

This list presents the reference coordinates and map section numbers for each county on the county subdivision maps on the following pages.

COUNTY	MAP SEC	MAP REF	COUNTY	MAP SEC	MAP REF	COUNTY	MAP SEC	MAP REF
Autauga	4	G-6	Dallas	3	G-5	Marengo	3	G-3
Baldwin	3	J-4	De Kalb	2	A-8	Marion	1	C-3
Barbour	4	H-9	Elmore	4	G-7	Marshall	2	B-7
Bibb	1	F-5	Escambia	3	J-4	Mobile	3	K-2
Blount	2	C-6	Etowah	2	C-7	Monroe	3	I-4
Bullock	4	H-8	Fayette	1	C-3	Montgomery	4	G-7
Butler	4	I-6	Franklin	1	B-3	Morgan	1	B-5
Calhoun	2	D-7	Geneva	4	J-7	Perry	1	F-5
Chambers	4	F-8	Greene	1	F-3	Pickens	1	E-3
Cherokee	2	B-8	Hale	1	F-4	Pike	4	I-7
Chilton	2	F-6	Henry	4	I-9	Randolph	2	E-8
Choctaw	3	H-2	Houston	4	J-9	Russell	4	G-9
Clarke	3	I-3	Jackson	2	A-7	St. Clair	2	D-6
Clay	2	E-8	Jefferson	2	D-6	Shelby	2	E-6
Cleburne	2	D-8	Lamar	1	C-3	Sumter	1	F-3
Coffee	4	I-7	Lauderdale	1	A-3	Talladega	2	D-7
Colbert	1	A-3	Lawrence	1	A-5	Tallapoosa	4	F-8
Conecuh	3	I-5	Lee	4	G-8	Tuscaloosa	1	E-4
Coosa	2	F-6	Limestone	1	A-5	Walker	1	C-4
Covington	4	J-6	Lowndes	4	H-6	Washington	3	I-2
Crenshaw	4	I-7	Macon	4	G-8	Wilcox	3	H-4
Cullman	1	C-5	Madison	2	A-6	Winston	1	C-4
Dale	4	I-8						

ALABAMA SECTION 1

ALABAMA SECTION 2



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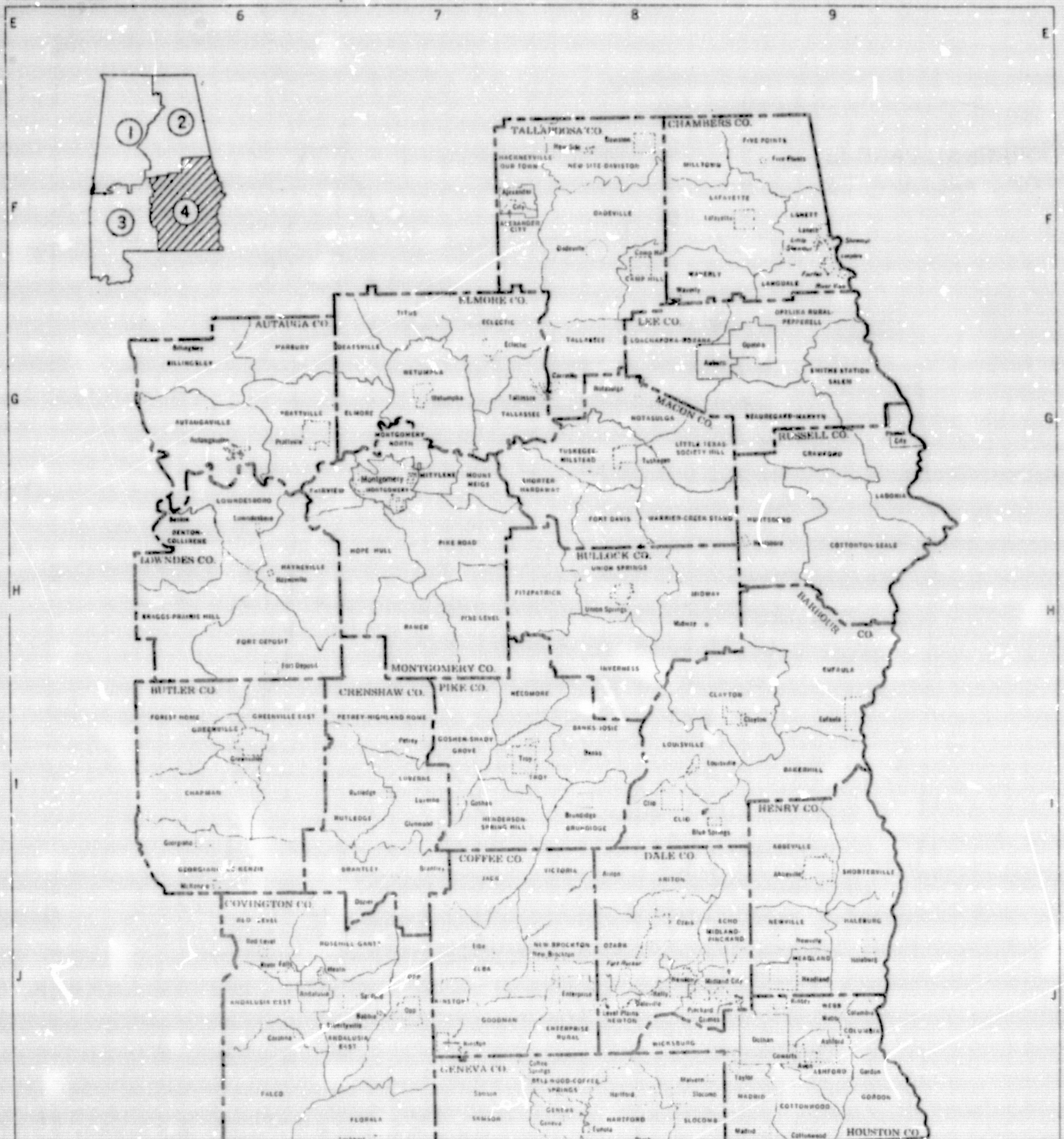
ALABAMA SECTION 4



Appendix B
Table of CCD Codes and Names

NOTE (Appendix B):

The county numbers listed in the tables on the following pages are not compatible with the ARISCENS data bases. Bureau of the Census county numbers are odd integers progressing in steps of two as 1, 3, 5, 7, 9,... To convert the Bureau of the Census county numbers (for Alabama) to those used both in ARISCENS and the normal county numbers in State references and tables, add one to the Bureau of the Census county number and divide the sum by two. For example, the Bureau of the Census number for Jefferson County is 73. The ARISCENS county number would be 37 [(73 +1)/2]. Similarly, Mobile's 97 converts to 49, etc.

The Bureau of the Census county numbers are in ascending sequence corresponding to the alphabetically ordered arrangement of the county names. The even numbers were skipped in order to permit space to insert any new counties which may be created.

<u>Geographic Identification Code Scheme: South</u>, U.S. Bureau of Census, Dept. of Commerce, 1972.

GEOGRAPHIC CODES									NAME
STATE	COUNTY	SMSA	ESR	SEA	CCD	PLACE	PLACE DESC	PLACE SIZE	
01	001		056	05					AUTAUGA
01	001		056	05	005				AUTAUGAVILLE DIV
01	001		056	05	005	0115	4	02	AUTAUGAVILLE
01	001		056	05	010				BILLINGSLEY DIV
01	001		056	05	010	0180	4	00	BILLINGSLEY
01	001		056	05	015				MARBURY DIV
01	001		056	05	020				PRATTVILLE DIV
01	001		056	05	020	1415	4	08	PRATTVILLE
01	003	5160	058	08					BALDWIN
01	003	5160	058	08	005				BAY MINETTE DIV
01	003	5160	058	08	005	0135	4	07	BAY MINETTE
01	003	5160	058	08	010				DAPHNE DIV
01	003	5160	058	08	010	0465	4	05	DAPHNE
01	003	5160	058	08	010	1602	5	05	SPANISH FORT (U)
01	003	5160	058	08	015				ELBERTA DIV
01	003	5160	058	08	015	0535	4	01	ELBERTA
01	003	5160	058	08	020				FAIRHOPE DIV
01	003	5160	058	08	020	0595	4	07	FAIRHOPE
01	003	5160	058	08	025				FOLEY DIV
01	003	5160	058	08	025	0645	4	06	FOLEY
01	003	5160	058	08	025	0310	4	07	GULF SHORES
01	003	5160	058	08	035				ROBERTSDALE DIV
01	003	5160	058	08	035	1075	4	02	LOXLEY
01	003	5160	058	08	035	1495	4	05	ROBERTSDALE
01	003	5160	058	08	035	1580	4	02	SILVERHILL
01	003	5160	058	08	040				STOCKTON DIV
01	003	5160	058	08	045				SUMMERDALE DIV
01	003	5160	058	08	045	1635	4	02	SUMMERDALE
01	005		041	09					BARBOUR
01	005		041	09	005				BAKERHILL DIV
01	005		041	09	010				CLAYTON DIV
01	005		041	09	010	0385	4	04	CLAYTON
01	005		041	09	015				CLIO DIV
01	005		041	09	015	0205	4	00	BLUE SPRINGS
01	005		041	09	015	0390	4	03	CLIO
01	005		041	09	020				EUFAULA DIV
01	005		041	09	020	0560	4	07	EUFAULA
01	005		041	09	025				LOUISVILLE DIV
01	005		041	09	025	1070	4	02	LOUISVILLE
01	007		056	05					BIBB
01	007		056	05	005				BRENT DIV
01	007		056	05	005	0240	4	05	BRENT
01	007		056	05	010				CENTREVILLE DIV
01	007		056	05	010	0345	4	05	CENTREVILLE
01	007		056	05	015				PIPER-COLEANOR DIV
01	007		056	05	020				WEST BLOCTON DIV
01	007		056	05	020	1815	4	03	WEST BLOCTON
01	009		055	02					BLOUNT
01	009		055	02	005				BLOUNTSVILLE DIV
01	009		055	02	005	0195	4	03	BLOUNTSVILLE
01	009		055	02	010				BROOKSVILLE DIV
01	009		055	02	015				CLARENCE DIV
01	009		055	02	015	1587	4	01	SNEAD
01	009		055	02	020				CLEVELAND DIV
01	009		055	02	020	0387	4	01	CLEVELAND
01	009		055	02	025				HAYDEN DIV
01	009		055	02	025	0865	4	00	HAYDEN
01	009		055	02	030				LOCUST FORK DIV
01	009		055	02	030	0430	4	00	COUNTY LINE (PART)
01	009		055	02	035				ONEONTA DIV
01	009		055	02	035	0045	4	01	ALLGOOD
01	009		055	02	035	0887	4	00	HIGHLAND LAKE
01	009		055	02	035	1305	4	06	ONEONTA
01	011		057	06					BULLOCK
01	011		057	06	005				FITZPATRICK DIV
01	011		057	06	010				INVERNESS DIV
01	011		057	06	015				MIDWAY DIV
01	011		057	06	015	1145	4	02	MIDWAY
01	011		057	06	020				UNION SPRINGS DIV
01	011		057	06	020	1735	4	06	UNION SPRINGS
01	013		041	09					BUTLER
01	013		041	09	005				CHAPMAN DIV
01	013		041	09	010				FOREST HOME DIV
01	013		041	09	015				GEORGIANA-MC KENZIE DIV
01	013		041	09	015	0725	4	05	GEORGIANA
01	013		041	09	015	1090	4	01	MC KENZIE
01	013		041	09	020				GREENVILLE DIV
01	013		041	09	020	0790	4	07	GREENVILLE
01	013		041	09	025				GREENVILLE EAST DIV
01	015		043	03					CALHOUN
01	015		043	03	005				ANNISTON DIV
01	015		043	03	005	0060	4	10	ANNISTON
01	015		043	03	010				CHOCCOLOCCO DIV
01	015		043	03	015				JACKSONVILLE DIV
01	015		043	03	015	0955	4	07	JACKSONVILLE
01	015		043	03	020				OHATCHEE DIV
01	015		043	03	020	1300	4	01	OHATCHEE
01	015		043	03	025				OXFORD DIV
01	015		043	03	025	0895	4	03	HOBSON CITY
01	015		043	03	025	1325	4	06	OXFORD
01	015		043	03	030				PIEDMONT DIV
01	015		043	03	030	1375	4	07	PIEDMONT

GEOGRAPHIC CODES									NAME
STATE	COUNTY	SMSA	ESR	SEA	CCD	PLACE	PLACE DESC	PLACE SIZE	
01	015		043	03	035				WEAVER DIV
01	015		043	03	035	0062	5	07	ANNISTON NORTHWEST (U)
01	015		043	03	035	0200	4	01	BLUE MOUNTAIN
01	015		043	03	035	0652	5	07	FORT MC CLELLAN (U)
01	015		043	03	035	1800	4	05	WEAVER
01	015		043	03	040				WEBSTERS CHAPEL-ALEXANDRIA VALLEY DIV
01	015		043	03	045				WEST END DIV
01	015		043	03	045	1822	5	07	WEST END-COBB TOWN (U)
01	017		042	04					CHAMBERS
01	017		042	04	005				FIVE POINTS DIV
01	017		042	04	005	0615	4	01	FIVE POINTS
01	017		042	04	010				LAFAYETTE DIV
01	017		042	04	010	1000	4	06	LAFAYETTE
01	017		042	04	015				LANETT DIV
01	017		042	04	015	1005	4	07	LANETT
01	017		042	04	015	1052	5	06	LITTLE SHAWMUT (U) (PART)
01	017		042	04	020				LANGDALE DIV
01	017		042	04	020	0585	5	06	FAIRFAX (U)
01	017		042	04	020	1010	5	05	LANGDALE (U)
01	017		042	04	020	1052	5	06	LITTLE SHAWMUT (U) (PART)
01	017		042	04	020	1485	5	03	RIVER VIEW (U)
01	017		042	04	020	1560	5	05	SHAWMUT (U)
01	017		042	04	025				MILLTOWN DIV
01	017		042	04	030				WAVERLY DIV
01	017		042	04	030	1795	4	01	WAVERLY (PART)
01	019		043	03					CHEROKEE
01	019		043	03	005				CEDAR BLUFF-GAYLESVILLE DIV
01	019		043	03	005	0330	4	02	CEDAR BLUFF
01	019		043	03	005	0710	4	00	GAYLESVILLE
01	019		043	03	010				CENTRE DIV
01	019		043	03	010	0340	4	05	CENTRE
01	019		043	03	015				LEESBURG DIV
01	019		043	03	015	0405	4	03	COLLINSVILLE (PART)
01	019		043	03	015	1017	4	00	LEESBURG
01	019		043	03	020				MUD CREEK DIV
01	021		056	05					CHILTON
01	021		056	05	005				CLANTON DIV
01	021		056	05	005	0380	4	07	CLANTON
01	021		056	05	010				ISABELLA-PLETCHER DIV
01	021		056	05	015				JEMISON DIV
01	021		056	05	015	0965	4	03	JEMISON
01	021		056	05	015	1685	4	02	THORSBY
01	021		056	05	020				MAPLESVILLE DIV
01	021		056	05	020	1110	4	02	MAPLESVILLE
01	021		056	05	025				MINERAL SPRINGS DIV
01	021		056	05	030				VERBENA DIV
01	023		059	07					CHOCTAW
01	023		059	07	005				BUTLER DIV
01	023		059	07	005	0280	4	05	BUTLER
01	023		059	07	010				GILBERTOWN-TOXEY DIV
01	023		059	07	010	0735	4	01	GILBERTOWN
01	023		059	07	010	1695	4	01	TOXEY
01	023		059	07	015				LISMAN DIV
01	023		059	07	015	1050	4	02	LISMAN
01	023		059	07	020				SILAS DIV
01	023		059	07	020	1570	4	01	SILAS
01	025		059	07					CLARKE
01	025		059	07	005				COFFEEVILLE DIV
01	025		059	07	005	040[illegible]	4	01	COFFEEVILLE
01	025		059	07	010				FULTON DIV
01	025		059	07	010	0670	4	02	FULTON
01	025		059	07	015				GROVE HILL DIV
01	025		059	07	015	0800	4	04	GROVE HILL
01	025		059	07	020				JACKSON NORTHWEST DIV
01	025		059	07	020	0950	4	07	JACKSON
01	025		059	07	025				JACKSON SOUTHEAST DIV
01	025		059	07	030				THOMASVILLE DIV
01	025		059	07	030	1680	4	06	THOMASVILLE
01	027		042	04					CLAY
01	027		042	04	005				ASHLAND DIV
01	027		042	04	005	0085	4	04	ASHLAND
01	027		042	04	010				LINEVILLE DIV
01	027		042	04	010	1040	4	04	LINEVILLE
01	027		042	04	015				MILLERVILLE-HOLLINS DIV
01	029		042	04					CLEBURNE
01	029		042	04	005				FRUITHURST DIV
01	029		042	04	005	0665	4	01	FRUITHURST
01	029		042	04	010				HEFLIN DIV
01	029		042	04	010	0525	4	00	EDWARDSVILLE
01	029		042	04	010	0880	4	06	HEFLIN
01	029		042	04	015				RANBURNE DIV
01	029		042	04	015	1445	4	01	RANBURNE
01	031		041	09					COFFEE
01	031		041	09	005				ELBA DIV
01	031		041	09	005	0530	4	06	ELBA
01	031		041	09	010				ENTERPRISE DIV
01	031		041	09	010	0545	4	08	ENTERPRISE
01	031		041	09	015				ENTERPRISE RURAL DIV
01	031		041	09	020				GOODMAN DIV
01	031		041	09	025				JACK DIV
01	031		041	09	030				KINSTON DIV

ORIGINAL PAGE IS
OF POOR QUALITY

GEOGRAPHIC CODES									NAME
STATE	COUNTY	SMSA	ESR	SEA	CCD	PLACE	PLACE DESC	PLACE SIZE	
01	031		041	09	030	0995	4	02	KINSTON
01	031		041	09	035				NEW BROCKTON DIV
01	031		041	09	035	1245	4	03	NEW BROCKTON
01	031		041	09	040				VICTORIA DIV
01	033		055	01					COLBERT
01	033		055	01	005				CHEROKEE DIV
01	033		055	01	005	0360	4	03	CHEROKEE
01	033		055	01	010				LEIGHTON DIV
01	033		055	01	010	1020	4	03	LEIGHTON
01	033		055	01	015				MUSCLE SHOALS DIV
01	033		055	01	015	1225	4	07	MUSCLE SHOALS
01	033		055	01	020				SHEFFIELD DIV
01	033		055	01	020	1565	4	08	SHEFFIELD
01	033		055	01	025				TUSCUMBIA DIV
01	033		055	01	025	1055	4	02	LITTLEVILLE
01	033		055	01	025	1725	4	07	TUSCUMBIA
01	035		041	09					CONECUH
01	035		041	09	005				CASTLEBERRY DIV
01	035		041	09	005	0325	4	02	CASTLEBERRY
01	035		041	09	010				EVERGREEN DIV
01	035		041	09	010	0575	4	06	EVERGREEN
01	035		041	09	015				LYEFFION DIV
01	035		041	09	020				REPTON DIV
01	035		041	09	020	1470	4	01	REPTON
01	035		041	09	025				SHREVE DIV
01	037		042	04					COOSA
01	037		042	04	005				GOODWATER-KELLYTON DIV
01	037		042	04	005	0755	4	05	GOODWATER
01	037		042	04	010				ROCKFORD DIV
01	037		042	04	010	1500	4	02	ROCKFORD
01	037		042	04	015				WEOGUFKA-MARBLE VALLEY DIV
01	039		041	09					COVINGTON
01	039		041	09	005				ANDALUSIA DIV
01	039		041	09	005	0055	4	08	ANDALUSIA
01	039		041	09	010				ANDALUSIA EAST DIV
01	039		041	09	010	0125	4	00	BABBIE
01	039		041	09	010	0875	4	01	HEATH
01	039		041	09	010	1027	4	00	LIBERTYVILLE
01	039		041	09	010	1525	4	01	SANFORD
01	039		041	09	015				ANDALUSIA WEST DIV
01	039		041	09	020				FALCO DIV
01	039		041	09	020	0307	4	00	CAROLINA
01	039		041	09	025				FLORALA DIV
01	039		041	09	025	0635	4	06	FLORALA
01	039		041	09	025	1065	4	02	LOCKHART
01	039		041	09	030				OPP DIV
01	039		041	09	030	1315	4	07	OPP
01	039		041	09	035				RED LEVEL DIV
01	039		041	09	035	1455	4	02	RED LEVEL
01	039		041	09	035	1475	4	02	RIVER FALLS
01	039		041	09	040				ROSEHILL-GANTT DIV
01	041		041	09					CRENSHAW
01	041		041	09	005				BRANTLEY DIV
01	041		041	09	005	0235	4	03	BRANTLEY
01	041		041	09	005	0510	4	01	DOZIER
01	041		041	09	010				LUVERNE DIV
01	041		041	09	010	0750	4	01	GLENWOOD
01	041		041	09	010	1080	4	05	LUVERNE
01	041		041	09	015				PETREY HIGHLAND HOME DIV
01	041		041	09	015	1360	4	00	PETREY
01	041		041	09	020				RUTLEDGE DIV
01	041		041	09	020	1515	4	01	RUTLEDGE
01	043		055	02					CULLMAN
01	043		055	02	005				BAILEYTON-JOPPA DIV
01	043		055	02	010				BREMEN DIV
01	043		055	02	015				CRANE HILL DIV
01	043		055	02	020				CULLMAN DIV
01	043		055	02	020	0450	4	08	CULLMAN
01	043		055	02	020	0752	4	02	GOOD HOPE
01	043		055	02	025				HANCEVILLE DIV
01	043		055	02	025	0700	4	02	GARDEN CITY
01	043		055	02	025	0845	4	05	HANCEVILLE
01	043		055	02	030				HOLLY POND DIV
01	043		055	02	030	0910	4	01	HOLLY POND
01	043		055	02	035				JONES CHAPEL DIV
01	043		055	02	040				LOGAN DIV
01	043		055	02	045				SIMCOE DIV
01	043		055	02	045	0597	4	01	FAIRVIEW
01	043		055	02	050				VINEMONT DIV
01	043		055	02	050	1767	4	01	VINEMONT
01	043		055	02	055				WELTI DIV
01	045		041	09					DALE
01	045		041	09	005				ARITON DIV
01	045		041	09	005	0075	4	02	ARITON
01	045		041	09	010				ECHO DIV
01	045		041	09	015				MIDLAND-PINCKARD DIV
01	045		041	09	015	0797	4	00	GRIMES
01	045		041	09	015	1140	4	03	MIDLAND CITY
01	045		041	09	015	1380	4	02	PINCKARD
01	045		041	09	020				NEWTON DIV
01	045		041	09	020	0460	4	07	DALEVILLE
01	045		041	09	020	0972	4	01	KELLY
01	045		041	09	020	1024	4	00	LEVEL PLAINS

GEOGRAPHIC CODES									NAME
STATE	COUNTY	SMSA	ESR	SEA	CCD	PLACE	PLACE DESC.	PLACE SIZE	
01	045		041	09	020	1255	4	04	NEWTON
01	045		041	09	025				OZARK DIV
01	045		041	09	025	0657	5	08	FORT RUCKER (U)
01	045		041	09	025	1330	4	08	OZARK
01	047		057	06					DALLAS
01	047		057	06	005				CARLOWVILLE DIV
01	047		057	06	010				CRAIG-TYLER DIV
01	047		057	06	010	0437	5	04	CRAIG (U)
01	047		057	06	010	1557	5	05	SELMONT-WEST SELMONT (U)
01	047		057	06	015				ORRVILLE DIV
01	047		057	06	015	1320	4	01	ORRVILLE
01	047		057	06	020				PLANTERSVILLE-WOODLAWN DIV
01	047		057	06	025				SAFFORD DIV
01	047		057	06	030				SARDIS DIV
01	047		057	06	035				SELMA DIV
01	047		057	06	035	1555	4	10	SELMA
01	049		055	02					DE KALB
01	049		055	02	005				COLLINSVILLE DIV
01	049		055	02	005	0405	4	03	COLLINSVILLE (PART)
01	049		055	02	010				CROSSVILLE DIV
01	049		055	02	010	0440	4	03	CROSSVILLE
01	049		055	02	015				DOG TOWN-FISCHER DIV
01	049		055	02	020				FORT PAYNE DIV
01	049		055	02	020	0655	4	07	FORT PAYNE
01	049		055	02	025				FYFFE DIV
01	049		055	02	025	0680	4	01	FYFFE
01	049		055	02	030				GERALDINE DIV
01	049		055	02	030	0730	4	02	GERALDINE
01	049		055	02	035				HENAGAR DIV
01	049		055	02	035	0886	4	02	HENAGAR
01	049		055	02	040				IDER DIV
01	049		055	02	045				RAINSVILLE-SYLVANIA DIV
01	049		055	02	045	1002	4	00	LAKEVIEW
01	049		055	02	045	1254	4	00	NEWSOME
01	049		055	02	045	1435	4	05	RAINSVILLE
01	049		055	02	045	1648	4	01	SYLVANIA
01	049		055	02	050				VALLEY HEAD-MENTONE DIV
01	049		055	02	050	0840	4	01	HAMMONDVILLE
01	049		055	02	050	1130	4	01	MENTONE
01	049		055	02	050	1745	4	01	VALLEY HEAD
01	051	5240	056	05					ELMORE
01	051	5240	056	05	005				DEATSVILLE DIV
01	051	5240	056	05	010				ECLECTIC DIV
01	051	5240	056	05	010	0520	4	03	ECLECTIC
01	051	5240	056	05	015				ELMORE DIV
01	051	5240	056	05	020				TALLASSEE DIV
01	051	5240	056	05	020	1665	4	06	TALLASSEE (PART)
01	051	5240	056	05	025				TITUS DIV
01	051	5240	056	05	030				WETUMPKA DIV
01	051	5240	056	05	030	1825	4	06	WETUMPKA
01	053		058	08					ESCAMBIA
01	053		058	08	005				ATMORE DIV
01	053		058	08	005	0100	4	07	ATMORE
01	053		058	08	010				BREWTON DIV
01	053		058	08	010	0245	4	07	BREWTON
01	053		058	08	010	1410	4	00	POLLARD
01	053		058	08	015				EAST ESCAMBIA DIV
01	053		058	08	015	0515	4	05	EAST BREWTON
01	053		058	08	015	1488	4	00	RIVERVIEW
01	053		058	08	020				FLOMATON DIV
01	053		058	08	020	0630	4	04	FLOMATON
01	053		058	08	025				MC CULLOUGH-HUXFORD DIV
01	055	2880	043	03					ETOWAH
01	055	2880	043	03	005				ALTOONA DIV
01	055	2880	043	03	005	0050	4	02	ALTOONA
01	055	2880	043	03	005	1780	4	01	WALNUT GROVE
01	055	2880	043	03	010				ATTALLA DIV
01	055	2880	043	03	010	0105	4	07	ATTALLA
01	055	2880	043	03	010	1460	4	01	REECE CITY
01	055	2880	043	03	015				GADSDEN DIV
01	055	2880	043	03	015	0685	3	11	GADSDEN
01	055	2880	043	03	020				GLENCOE DIV
01	055	2880	043	03	020	0745	4	06	GLENCOE
01	055	2880	043	03	020	1595	4	02	SOUTHSIDE
01	055	2880	043	03	025				HOKES BLUFF DIV
01	055	2880	043	03	025	0905	4	05	HOKES BLUFF
01	055	2880	043	03	030				LOOKOUT MOUNTAIN DIV
01	055	2880	043	03	035				MOUNTAINBORO DIV
01	055	2880	043	03	035	0210	4	07	BOAZ (PART)
01	055	2880	043	03	035	1202	4	01	MOUNTAINBORO
01	055	2880	043	03	035	1532	4	01	SARDIS
01	055	2880	043	03	040				RAINBOW CITY DIV
01	055	2880	043	03	040	1430	4	06	RAINBOW CITY (PART)
01	055	2880	043	03	045				TURKEYTOWN DIV
01	055	2880	043	03	050				WILLS VALLEY DIV
01	057		056	05					FAYETTE
01	057		056	05	005				BERRY DIV
01	057		056	05	005	0170	4	02	BERRY
01	057		056	05	010				FAYETTE DIV
01	057		056	05	010	0610	4	06	FAYETTE
01	057		056	05	015				NORTH RIVER DIV
01	057		056	05	015	0740	4	01	GLEN ALLEN (PART)
01	057		056	05	020				RUSSELL DIV
01	057		056	05	020	1840	4	06	WINFIELD (PART)

ORIGINAL PAGE IS
OF POOR QUALITY

GEOGRAPHIC CODES									
STATE	COUNTY	SMSA	ESR	SEA	CCD	PLACE	PLACE DESC.	PLACE SIZE	NAME
01	059		056	05					FRANKLIN
01	059		056	05	005				PHIL CAMPBELL DIV
01	059		056	05	005	1370	4	03	PHIL CAMPBELL
01	059		056	05	010				RED BAY DIV
01	059		056	05	010	1450	4	05	RED BAY
01	059		056	05	015				RUSSELLVILLE DIV
01	059		056	05	015	1510	4	07	RUSSELLVILLE
01	059		056	05	020				VINA DIV
01	059		056	05	020	0900	4	01	HODGES
01	059		056	05	020	1760	4	01	VINA
01	061		041	09					GENEVA
01	061		041	09	005				BELLWOOD-COFFEE SPRINGS DIV
01	061		041	09	005	0395	4	01	COFFEE SPRINGS
01	061		041	09	010				GENEVA DIV
01	061		041	09	010	0720	4	06	GENEVA
01	061		041	09	015				HARTFORD DIV
01	061		041	09	015	0190	4	00	BLACK
01	061		041	09	015	0565	4	00	EUNOLA
01	061		041	09	015	0855	4	06	HARTFORD
01	061		041	09	020				SAMSON DIV
01	061		041	09	020	1520	4	05	SAMSON
01	061		041	09	025				SLOCOMB DIV
01	061		041	09	025	1105	4	01	MALVERN
01	061		041	09	025	1585	4	04	SLOCOMB
01	063		057	06					GREENE
01	063		057	06	005				BOLIGEE DIV
01	063		057	06	005	0215	4	01	BOLIGEE
01	063		057	06	010				EUTAW DIV
01	063		057	06	010	0570	4	06	EUTAW
01	063		057	06	015				FORKLAND-TISHABEE DIV
01	063		057	06	020				MANTUA-WEST GREENE DIV
01	065		057	06					HALE
01	065		057	06	005				GREENSBORO DIV
01	065		057	06	005	0785	4	06	GREENSBORO
01	065		057	06	010				MOUNDVILLE DIV
01	065		057	06	010	1200	4	02	MOUNDVILLE (PART)
01	065		057	06	015				MOUNT HERMAN VALLEY DIV
01	065		057	06	020				PRAIRIE EDEN-NEWBERN DIV
01	065		057	06	020	1240	4	01	NEWBERN
01	065		057	06	025				RIVER BEND DIV
01	065		057	06	030				SAWYERVILLE DIV
01	065		057	06	035				STEWART-AKRON DIV
01	065		057	06	035	0020	[illegible]	02	AKRON
01	067		041	09					HENRY
01	067		041	09	005				ABBEVILLE DIV
01	067		041	09	005	0005	4	06	ABBEVILLE
01	067		041	09	010				HALEBURG DIV
01	067		041	09	010	0828	4	00	HALEBURG
01	067		041	09	015				HEADLAND DIV
01	067		041	09	015	0870	4	06	HEADLAND
01	067		041	09	020				NEWVILLE DIV
01	067		041	09	020	1260	4	01	NEWVILLE
01	067		041	09	025				SHORTERVILLE DIV
01	069		041	09					HOUSTON
01	069		041	09	005				ASHFORD DIV
01	069		041	09	005	0080	4	04	ASHFORD
01	069		041	09	005	0120	4	01	AVON
01	069		041	09	005	0436	4	01	COWARTS
01	069		041	09	010				COLUMBIA DIV
01	069		041	09	010	0410	4	02	COLUMBIA
01	069		041	09	015				COTTONWOOD DIV
01	069		041	09	015	0425	4	03	COTTONWOOD
01	069		041	09	020				DOTHAN DIV
01	069		041	09	020	0500	4	10	DOTHAN
01	069		041	09	025				GORDON DIV
01	069		041	09	025	0765	4	01	GORDON
01	069		041	09	030				MADRID DIV
01	069		041	09	030	1100	4	01	MADRID
01	069		041	09	030	1672	4	00	TAYLOR
01	069		041	09	035				WEBB DIV
01	069		041	09	035	0990	4	01	KINSEY
01	069		041	09	035	1805	4	01	WEBB
01	069		041	09	040				WICKSBURG DIV
01	071		055	02					JACKSON
01	071		055	02	005				BRIDGEPORT DIV
01	071		055	02	005	0250	4	06	BRIDGEPORT
01	071		055	02	010				LONG ISLAND DIV
01	071		055	02	015				PAINT ROCK DIV
01	071		055	02	015	1335	4	01	PAINT ROCK
01	071		055	02	015	1845	4	01	WOODVILLE
01	071		055	02	020				PISGAH DIV
01	071		055	02	020	1395	4	02	PISGAH
01	071		055	02	025				PRINCETON DIV
01	071		055	02	030				SCOTTSBORO DIV
01	071		055	02	030	0915	4	01	HOLLYWOOD
01	071		055	02	030	1540	4	07	SCOTTSBORO
01	071		055	02	035				SECTION DIV
01	071		055	02	035	0513	4	01	DUTTON
01	071		055	02	035	1550	4	02	SECTION
01	071		055	02	040				STEVENSON DIV
01	071		055	02	040	1620	4	05	STEVENSON
01	073	1000	043	A					JEFFERSON
01	073	1000	043	A	005				ADAMSVILLE DIV
01	073	1000	043	A	005	0010	4	05	ADAMSVILLE
01	073	1000	043	A	005	0265	4	02	BROOKSIDE
01	073	1000	043	A	005	0305	4	00	CARDIFF
01	073	1000	043	A	005	0622	5	03	FLAT CREEK-WEGRA-PRACO (U) (PART)
01	073	1000	043	A	005	0647	5	07	FORESTDALE (U) (PART)
01	073	1000	043	A	005	0780	4	06	GRAYSVILLE
01	073	1000	043	A	005	1823	4	01	WEST JEFFERSON
01	073	1000	043	A	010				BESSEMER DIV
01	073	1000	043	A	010	0175	4	10	BESSEMER
01	073	1000	043	A	015				BIRMINGHAM DIV
01	073	1000	043	A	015	0185	3	13	BIRMINGHAM
01	073	1000	043	A	020				BRIGHTON DIV
01	073	1000	043	A	020	0255	4	05	BRIGHTON
01	073	1000	043	A	020	1135	4	07	MIDFIELD
01	073	1000	043	A	020	1507	4	06	ROOSEVELT
01	073	1000	043	A	025				CATHERWOOD PARK DIV
01	073	1000	043	A	025	1220	4	02	MULGA
01	073	1000	043	A	030				DOCENA DIV
01	073	1000	043	A	030	0492	5	03	DOCENA (U)
01	073	1000	043	A	030	0647	5	07	FORESTDALE (U) (PART)
01	073	1000	043	A	035				DOLOMITE DIV
01	073	1000	043	A	040				FAIRFIELD DIV
01	073	1000	043	A	040	0590	4	08	FAIRFIELD
01	073	1000	043	A	045				FULTONDALE DIV
01	073	1000	043	A	045	0647	5	07	FORESTDALE (U) (PART)
01	073	1000	043	A	045	0675	4	07	FULTONDALE
01	073	1000	043	A	050				GARDENDALE DIV
01	073	1000	043	A	050	0705	4	07	GARDENDALE
01	073	1000	043	A	055				GREENWOOD DIV
01	073	1000	043	A	060				HOMEWOOD DIV
01	073	1000	043	A	060	0925	4	09	HOMEWOOD
01	073	1000	043	A	065				IRONDALE-TRUSSVILLE DIV
01	073	1000	043	A	065	0945	4	06	IRONDALE
01	073	1000	043	A	065	1715	4	06	TRUSSVILLE
01	073	1000	043	A	070				ISHKOODA DIV
01	073	1000	043	A	075				LEEDS DIV
01	073	1000	043	A	075	1015	4	07	LEEDS (PART)
01	073	1000	043	A	080				LIPSCOMB DIV
01	073	1000	043	A	080	0270	4	02	BROWNVILLE
01	073	1000	043	A	080	1045	4	06	LIPSCOMB
01	073	1000	043	A	085				MORRIS DIV
01	073	1000	043	A	085	0430	4	00	COUNTY LINE (PART)
01	073	1000	043	A	085	0985	4	02	KIMBERLY
01	073	1000	043	A	085	1190	4	02	MORRIS
01	073	1000	043	A	085	1700	4	02	TRAFFORD
01	073	1000	043	A	090				MOUNTAIN BROOK DIV
01	073	1000	043	A	090	1205	4	08	MOUNTAIN BROOK
01	073	1000	043	A	095				MOUNT PINSON DIV
01	073	1000	043	A	095	0335	5	08	CENTER POINT (U)
01	073	1000	043	A	100				NORTH HIGHLANDS DIV
01	073	1000	043	A	100	0930	4	07	HUEYTOWN
01	073	1000	043	A	105				NORTH JOHNS-WEST BESSEMER DIV
01	073	1000	043	A	105	1270	4	01	NORTH JOHNS
01	073	1000	043	A	110				OVERTON DIV
01	073	1000	043	A	115				PLEASANT GROVE DIV
01	073	1000	043	A	115	1125	4	02	MAYTOWN
01	073	1000	043	A	115	1405	4	07	PLEASANT GROVE
01	073	1000	043	A	115	1650	4	01	SYLVAN SPRINGS
01	073	1000	043	A	120				RUTLEDGE SPRINGS-WOODWARD DIV
01	073	1000	043	A	125				TARRANT CITY DIV
01	073	1000	043	A	125	1670	4	07	TARRANT CITY
01	073	1000	043	A	130				VESTAVIA HILLS DIV
01	073	1000	043	A	130	0207	5	08	BLUFF PARK (U)
01	073	1000	043	A	130	0927	4	03	HOOVER
01	073	1000	043	A	130	1755	4	07	VESTAVIA HILLS
01	073	1000	043	A	135				WARRIOR DIV
01	073	1000	043	A	135	1785	4	06	WARRIOR
01	075		055	05					LAMAR
01	075		056	05	005				MILLPORT DIV
01	075		056	05	005	0975	4	01	KENNEDY
01	075		056	05	005	1155	4	03	MILLPORT
01	075		056	05	010				SULLIGENT DIV
01	075		056	05	010	0160	4	01	BEAVERTON
01	075		056	05	010	0490	4	00	DETROIT
01	075		056	05	010	1625	4	04	SULLIGENT
01	075		056	05	015				VERNON DIV
01	075		056	05	015	1750	4	05	VERNON
01	077		055	01					LAUDERDALE
01	077		055	01	005				CLOVERDALE DIV
01	077		055	01	010				FLORENCE DIV
01	077		055	01	010	0640	4	10	FLORENCE
01	077		055	01	015				KILLEN DIV
01	077		055	01	015	0980	4	02	KILLEN
01	077		055	01	020				LEXINGTON DIV
01	077		055	01	020	1025	4	01	LEXINGTON
01	077		055	01	025				OAKLAND DIV
01	077		055	01	030				ROGERSVILLE DIV
01	077		055	01	030	1505	4	02	ROGERSVILLE
01	077		055	01	035				ST FLORIAN DIV
01	077		055	01	040				WATERLOO DIV
01	077		055	01	040	1790	4	01	WATERLOO
01	079		055	01					LAWRENCE
01	079		055	01	005				HATTON DIV
01	079		055	01	010				HILLSBORO DIV
01	079		055	01	010	0890	4	01	HILLSBORO
01	079		055	01	015				MORRIS CHAPEL DIV
01	079		055	01	020				MOULTON DIV
01	079		055	01	020	1195	4	05	MOULTON
01	079		055	01	025				MOUNT HOPE DIV
01	079		055	01	030				SPEAKE-OAKVILLE DIV

GEOGRAPHIC CODES									NAME
STATE	COUNTY	SMSA	ESR	SEA	CCD	PLACE	PLACE DESC.	PLACE SIZE	
01	079		055	01	035				TOWN CREEK-COURTLAND DIV
01	079		055	01	035	0435	4	02	COURTLAND
01	079		055	01	035	1690	4	03	TOWN CREEK
01	081		042	04					LEE
01	081		042	04	005				AUBURN DIV
01	081		042	04	005	0110	4	09	AUBURN
01	081		042	04	010				BEAUREGARD-MARVYN DIV
01	081		042	04	015				LOACHAPOKA-ROXANA DIV
01	081		042	04	015	1280	4	02	NOTASULGA (PART)
01	081		042	04	015	1795	4	01	WAVERLY (PART)
01	081		042	04	020				OPELIKA DIV
01	081		042	04	020	1310	4	08	OPELIKA
01	081		042	04	025				OPELIKA RURAL-PEPPERELL DIV
01	081		042	04	035				SMITHS STATION-SALEM DIV
01	083	3440	055	01					LIMESTONE
01	083	3440	055	01	005				ATHENS DIV
01	083	3440	055	01	005	0095	4	[illegible]	ATHENS
01	083	3440	055	01	010				CAPSHAW DIV
01	083	3440	055	01	015				ELKMONT DIV
01	083	3440	055	01	015	0540	4	01	ELKMONT
01	083	3440	055	01	020				GEORGIA DIV
01	083	3440	055	01	025				MOORESVILLE DIV
01	083	3440	055	01	025	1185	4	00	MOORESVILLE
01	083	3440	055	01	030				SALEM DIV
01	083	3440	055	01	030	1023	4	00	LESTER
01	083	3440	055	01	035				SAND SPRINGS DIV
01	083	3440	055	01	035	0070	4	02	ARDMORE
01	083	3440	055	01	040				TANNER DIV
01	085		057	06					LOWNDES
01	085		057	06	005				BENTON-COLLIRENE DIV
01	085		057	06	005	0167	4	00	BENTON
01	085		057	06	010				BRAGGS-PRAIRIE HILL DIV
01	085		057	06	015				FORT DEPOSIT DIV
01	085		057	06	015	0650	4	03	FORT DEPOSIT
01	085		057	06	020				HAYNEVILLE DIV
01	085		057	06	020	0867	4	01	HAYNEVILLE
01	085		057	06	025				LOWNDESBORO DIV
01	085		057	06	025	1072	4	01	LOWNDESBORO
01	087		056	05					MACON
01	087		056	05	005				FORT DAVIS DIV
01	087		056	05	010				LITTLE TEXAS-SOCIETY HILL DIV
01	087		056	05	015				NOTASULGA DIV
01	087		056	05	015	1280	4	02	NOTASULGA (PART)
01	087		056	05	020				SHORTER-HARDAWAY DIV
01	087		056	05	025				TUSKEGEE-MILSTEAD DIV
01	087		056	05	025	1730	4	08	TUSKEGEE
01	087		056	05	030				WARRIOR-CREEK STAND DIV
01	089	3440	055	F					MADISON
01	089	3440	055	F	005				ARSENAL DIV
01	089	3440	055	F	005	1702	4	01	TRIANA
01	089	3440	055	F	010				GURLEY DIV
01	089	3440	055	F	010	0817	4	02	GURLEY
01	089	3440	055	F	015				HARVEST-MADISON DIV
01	089	3440	055	F	015	1095	4	06	MADISON
01	089	3440	055	F	020				HAZEL GREEN DIV
01	089	3440	055	F	025				HUNTSVILLE DIV
01	089	3440	055	F	025	0935	3	12	HUNTSVILLE
01	089	3440	055	F	030				MADISON CROSSROADS DIV
01	089	3440	055	F	035				MERIDIANVILLE DIV
01	089	3440	055	F	040				NEW HOPE DIV
01	089	3440	055	F	040	1250	4	03	NEW HOPE
01	089	3440	055	F	040	1324	4	02	OWENS CROSSROADS
01	089	3440	055	F	045				NEW MARKET DIV
01	091		057	06					MARENGO
01	091		057	06	005				DEMOPOLIS DIV
01	091		057	06	005	0485	4	07	DEMOPOLIS
01	091		057	06	010				DIXONS MILL DIV
01	091		057	06	015				FAUNSDALE DIV
01	091		057	06	015	0475	4	00	DAYTON
01	091		057	06	015	0605	4	01	FAUNSDALE
01	091		057	06	020				LINDEN DIV
01	091		057	06	020	1035	4	06	LINDEN
01	091		057	06	020	1230	4	01	MYRTLEWOOD
01	091		057	06	025				SWEET WATER DIV
01	091		057	06	025	1637	4	01	SWEET WATER
01	091		057	06	030				THOMASTON DIV
01	091		057	06	030	1675	4	02	THOMASTON
01	093		056	05					MARION
01	093		056	05	005				BEAR CREEK DIV
01	093		056	05	005	0150	4	01	BEAR CREEK
01	093		056	05	010				BEXAR DIV
01	093		056	05	015				BRILLIANT DIV
01	093		056	05	015	0260	4	02	BRILLIANT
01	093		056	05	020				GUIN DIV
01	093		056	05	020	0805	4	05	GUIN
01	093		056	05	020	0820	4	01	GU-WIN
01	093		056	05	025				HACKLEBURG DIV
01	093		056	05	025	0825	4	02	HACKLEBURG
01	093		056	05	030				HAMILTON DIV
01	093		056	05	030	0835	4	06	HAMILTON
01	093		056	05	030	1823	4	01	WESTON
01	093		056	05	035				WINFIELD DIV
01	093		056	05	035	0740	4	01	GLEN ALLEN (PART)
01	093		056	05	035	1840	4	06	WINFIELD (PART)
01	095		055	02					MARSHALL
01	095		055	02	005				ALBERTVILLE DIV
01	095		055	02	005	0030	4	07	ALBERTVILLE
01	095		055	02	010				ARAB DIV
01	095		055	02	010	0065	4	06	ARAB
01	095		055	02	015				BOAZ DIV
01	095		055	02	015	0210	4	07	BOAZ (PART)
01	095		055	02	020				DOUGLAS DIV
01	095		055	02	025				GRANT DIV
01	095		055	02	025	0775	4	01	GRANT
01	095		055	02	030				GUNTERSVILLE DIV
01	095		055	02	030	0815	4	07	GUNTERSVILLE
01	095		055	02	035				TOWN CREEK DIV
01	095		055	02	040				UNION GROVE DIV
01	095		055	02	040	1732	4	00	UNION GROVE
01	097	5160	058	D					MOBILE
01	097	5160	058	D	005				BAYOU LA BATRE DIV
01	097	5160	058	D	005	0140	4	06	BAYOU LA BATRE
01	097	5160	058	D	010				CHICKASAW DIV
01	097	5160	058	D	010	0365	4	07	CHICKASAW
01	097	5160	058	D	015				CITRONELLE DIV
01	097	5160	058	D	015	0375	4	04	CITRONELLE
01	097	5160	058	D	020				EIGHT MILE DIV
01	097	5160	058	D	025				GRAND BAY DIV
01	097	5160	058	D	030				MOBILE DIV
01	097	5160	058	D	030	1165	3	12	MOBILE
01	097	5160	058	D	035				MOUNT VERNON DIV
01	097	5160	058	D	035	1215	4	03	MOUNT VERNON
01	097	5160	058	D	040				PRICHARD DIV
01	097	5160	058	D	040	1420	4	10	PRICHARD
01	097	5160	058	D	045				SARALAND DIV
01	097	5160	058	D	045	1530	4	07	SARALAND
01	097	5160	058	D	045	1535	4	05	SATSUMA
01	097	5160	058	D	050				SEMMES DIV
01	097	5160	058	D	055				TANNER-WILLIAMS DIV
01	097	5160	058	D	060				THEODORE DIV
01	099		041	09					MONROE
01	099		041	09	005				BEATRICE DIV
01	099		041	09	005	0155	4	01	BEATRICE
01	099		041	09	010				FRISCO CITY DIV
01	099		041	09	010	0580	4	01	EXCEL
01	099		041	09	010	0660	4	03	FRISCO CITY
01	099		041	09	015				MONROEVILLE DIV
01	099		041	09	015	1170	4	06	MONROEVILLE
01	099		041	09	020				PETERMAN DIV
01	099		041	09	025				URIAH DIV
01	099		041	09	030				VREDENBURGH DIV
01	099		041	09	030	1770	4	02	VREDENBURGH (PART)
01	101	5240	057	C					MONTGOMERY
01	101	5240	057	C	010				FAIRVIEW DIV
01	101	5240	057	C	015				HOPE HULL DIV
01	101	5240	057	C	020				MITYLENE DIV
01	101	5240	057	C	025				MONTGOMERY DIV
01	101	5240	057	C	025	1180	3	12	MONTGOMERY
01	101	5240	057	C	027				MONTGOMERY NORTH DIV
01	101	5240	057	C	030				MOUNT MEIGS DIV
01	101	5240	057	C	035				PIKE ROAD DIV
01	101	5240	057	C	040				PINE LEVEL DIV
01	101	5240	057	C	045				RAMER DIV
01	103		055	01					MORGAN
01	103		055	01	010				DANVILLE DIV
01	103		055	01	015				DECATUR DIV
01	103		055	01	015	0480	4	10	DECATUR
01	103		055	01	015	0625	4	01	FLINT CITY
01	103		055	01	015	1705	4	02	TRINITY
01	103		055	01	020				EVA DIV
01	103		055	01	020	0572	4	00	EVA
01	103		055	01	025				FALKVILLE DIV
01	103		055	01	025	0600	4	02	FALKVILLE
01	103		055	01	030				HARTSELLE DIV
01	103		055	01	030	0860	4	07	HARTSELLE
01	103		055	01	035				LACEYS SPRING DIV
01	103		055	01	040				SOMERVILLE DIV
01	103		055	01	040	1590	4	00	SOMERVILLE
01	105		057	06					PERRY
01	105		057	06	005				HAMBURG DIV
01	105		057	06	010				HEIBERGER DIV
01	105		057	06	015				MARION DIV
01	105		057	06	015	1120	4	06	MARION
01	105		057	06	020				SPROTT DIV
01	105		057	06	025				UNIONTOWN DIV
01	105		057	06	025	1740	4	05	UNIONTOWN
01	107		056	05					PICKENS
01	107		056	05	005				ALICEVILLE DIV
01	107		056	05	005	0040	4	06	ALICEVILLE
01	107		056	05	010				CARROLLTON DIV
01	107		056	05	010	0310	4	02	CARROLLTON
01	107		056	05	010	1373	4	00	PICKENSVILLE
01	107		056	05	015				ETHELSVILLE DIV
01	107		056	05	015	0555	4	00	ETHELSVILLE
01	107		056	05	020				GORDO DIV
01	107		056	05	020	0760	4	04	GORDO

STATE	COUNTY	SMSA	ESR	SEA	CCD	PLACE	PLACE DESC	PLACE SIZE	NAME
01	107		056	05	025				RALEIGH DIV
01	107		056	05	030				REFORM DIV
01	107		056	05	030	1465	4	04	REFORM
01	109		041	09					PIKE
01	109		041	09	005				BANKS-JOSIE DIV
01	109		041	09	005	0130	4	00	BANKS
01	109		041	09	010				BRUNDIDGE DIV
01	109		041	09	010	0275	4	06	BRUNDIDGE
01	109		041	09	015				GOSHEN-SHADY GROVE DIV
01	109		041	09	015	0770	4	01	GOSHEN
01	109		041	09	020				HENDERSON-SPRING HILL DIV
01	109		041	09	025				NEEDMORE DIV
01	109		041	09	030				TROY DIV
01	109		041	09	030	1710	4	08	TROY
01	111		042	04					RANDOLPH
01	111		042	04	005				FOLSOM DIV
01	111		042	04	010				ROANOKE DIV
01	111		042	04	010	1490	4	07	ROANOKE
01	111		042	04	015				WADLEY DIV
01	111		042	04	015	1775	4	02	WADLEY
01	111		042	04	020				WEDOWEE DIV
01	111		042	04	020	1810	4	02	WEDOWEE
01	111		042	04	025				WOODLAND DIV
01	111		042	04	025	1843	4	00	WOODLAND
01	113	1800	035	B					RUSSELL
01	113	1800	035	B	005				COTTONTON-SEALE DIV
01	113	1800	035	B	010				CRAWFORD DIV
01	113	1800	035	B	015				HURTSBORO DIV
01	113	1800	035	B	015	0940	4	02	HURTSBORO
01	113	1800	035	B	020				LADONIA DIV
01	113	1800	035	B	025				PHENIX CITY DIV
01	113	1800	035	B	025	1365	4	10	PHENIX CITY
01	115		043	03					ST CLAIR
01	115		043	03	005				ASHVILLE DIV
01	115		043	03	005	0090	4	02	ASHVILLE
01	115		043	03	005	1430	4	06	RAINBOW CITY (PART)
01	115		043	03	005	1615	4	02	STEELE
01	115		043	03	010				MOODY DIV
01	115		043	03	010	1015	4	07	LEEDS (PART)
01	115		043	03	010	1163	4	02	MOODY
01	115		043	03	010	1827	4	01	WHITES CHAPEL
01	115		043	03	015				PELL CITY DIV
01	115		043	03	015	1350	4	07	PELL CITY
01	115		043	03	015	1480	4	01	RIVERSIDE
01	115		043	03	020				RAGLAND DIV
01	115		043	03	020	1425	4	03	RAGLAND
01	115		043	03	025				SPRINGVILLE DIV
01	115		043	03	025	0233	4	01	BRANCHVILLE
01	115		043	03	025	1115	4	02	MARGARET
01	115		043	03	025	1295	4	02	ODENVILLE
01	115		043	03	025	1610	4	03	SPRINGVILLE
01	117	1000	043	03					SHELBY
01	117	1000	043	03	005				CALERA DIV
01	117	1000	043	03	005	0285	4	04	CALERA
01	117	1000	043	03	010				CHELSEA DIV
01	117	1000	043	03	010	1015	4	07	LEEDS (PART)
01	117	1000	043	03	015				COLUMBIANA DIV
01	117	1000	043	03	015	0415	4	05	COLUMBIANA
01	117	1000	043	03	020				HELENA DIV
01	117	1000	043	03	020	0885	4	03	HELENA
01	117	1000	043	03	020	1347	4	02	PELHAM
01	117	1000	043	03	025				MONTEVALLO DIV
01	117	1000	043	03	025	1175	4	06	MONTEVALLO
01	117	1000	043	03	025	1835	4	02	WILTON
01	117	1000	043	03	030				SILURIA DIV
01	117	1000	043	03	030	0025	4	06	ALABASTER
01	117	1000	043	03	030	1575	4	02	SILURIA
01	117	1000	043	03	035				VINCENT DIV
01	117	1000	043	03	035	0850	4	02	HARPERSVILLE
01	117	1000	043	03	035	1765	4	03	VINCENT
01	117	1000	043	03	040				WILSONVILLE DIV
01	117	1000	043	03	040	1830	4	02	WILSONVILLE
01	119		057	06					SUMTER
01	119		057	06	005				BELMONT DIV
01	119		057	06	010				CUBA DIV
01	119		057	06	010	0445	4	01	CUBA
01	119		057	06	015				GAINESVILLE DIV
01	119		057	06	015	0690	4	01	GAINESVILLE
01	119		057	06	020				LIVINGSTON DIV
01	119		057	06	020	0550	4	01	EPES
01	119		057	06	020	1060	4	05	LIVINGSTON
01	119		057	06	025				PANOLA-GEIGER DIV
01	119		057	06	025	[illegible]715	4	00	GEIGER
01	119		057	06	030				YORK DIV
01	119		057	06	030	1850	4	06	YORK
01	121		043	03					TALLADEGA
01	121		043	03	005				CHILDERSBURG DIV
01	121		043	03	005	0220	4	01	BON AIR
01	121		043	03	005	0370	4	06	CHILDERSBURG
01	121		043	03	010				FAYETTEVILLE-TALLADEGA SPRINGS DIV
01	121		043	03	010	0695	4	00	GANTTS QUARRY
01	121		043	03	010	1150	5	04	MIGNON (U)
01	121		043	03	010	1282	4	01	OAK GROVE
01	121		043	03	010	1660	4	00	TALLADEGA SPRINGS
01	121		043	03	015				HOWELLS-COVE DIV
01	121		043	03	020				LINCOLN-EASTABOGA DIV
01	121		043	03	020	1030	4	03	LINCOLN
01	121		043	03	025				MUNFORD DIV
01	121		043	03	030				RENFROE-LANIER DIV
01	121		043	03	035				STOCKDALE-CHANDLER SPRINGS DIV
01	121		043	03	040				SYCAMORE-WINTERBORO DIV
01	121		043	03	045				SYLACAUGA DIV
01	121		043	03	045	1645	4	08	SYLACAUGA
01	121		043	03	050				TALLADEGA DIV
01	121		043	03	050	1655	4	08	TALLADEGA
01	123		042	04					TALLAPOOSA
01	123		042	04	005				ALEXANDER CITY DIV
01	123		042	04	005	0035	4	08	ALEXANDER CITY
01	123		042	04	010				CAMP HILL DIV
01	123		042	04	010	0295	4	04	CAMP HILL
01	123		042	04	015				DADEVILLE DIV
01	123		042	04	015	0455	4	06	DADEVILLE
01	123		042	04	020				HACKNEYVILLE-OUR TOWN DIV
01	123		042	04	025				NEW SITE-DAVISTON DIV
01	123		042	04	025	0470	4	01	DAVISTON
01	123		042	04	025	1253	4	01	NEW SITE
01	123		042	04	030				TALLASSEE DIV
01	123		042	04	030	0315	4	02	CARRVILLE
01	123		042	04	030	1665	4	06	TALLASSEE (PART)
01	125	8600	056	E					TUSCALOOSA
01	125	8600	056	E	005				ABERNANT DIV
01	125	8600	056	E	010				BIG SANDY-DUNCANVILLE DIV
01	125	8600	056	E	010	1200	4	02	MOUNDVILLE (PART)
01	125	8600	056	E	015				BROOKWOOD DIV
01	125	8600	056	E	020				COALING-VANCE DIV
01	125	8600	056	E	025				COKER DIV
01	125	8600	056	E	030				ELROD-MOORES BRIDGE-ECHOLA DIV
01	125	8600	056	E	033				ENGLEWOOD DIV
01	125	8600	056	E	035				FOSTERS DIV
01	125	8600	056	E	045				NORTHPORT DIV
01	125	8600	056	E	045	1275	4	07	NORTHPORT
01	125	8600	056	E	050				SAMANTHA DIV
01	125	8600	056	E	060				TUSCALOOSA DIV
01	125	8600	056	E	060	1720	3	11	TUSCALOOSA
01	125	8600	056	E	065				WINDHAM SPRINGS DIV
01	127	1000	043	03					WALKER
01	127	1000	043	03	005				CARBON HILL DIV
01	127	1000	043	03	005	0300	4	04	CARBON HILL
01	127	1000	043	03	005	0970	4	01	KANSAS
01	127	1000	043	03	010				CORDOVA DIV
01	127	1000	043	03	010	0420	4	06	CORDOVA
01	127	1000	043	03	015				DORA DIV
01	127	1000	043	03	015	0495	4	04	DORA
01	127	1000	043	03	015	1630	4	05	SUMITON
01	127	1000	043	03	020				EAST JASPER DIV
01	127	1000	043	03	025				EMPIRE DIV
01	127	1000	043	03	030				FLAT CREEK-WEGRA DIV
01	127	1000	043	03	030	0622	5	03	FLAT CREEK-WEGRA-PRACO (U) (PART)
01	127	1000	043	03	035				JASPER DIV
01	127	1000	043	03	035	0960	4	08	JASPER
01	127	1000	043	03	040				MANCHESTER DIV
01	127	1000	043	03	045				NAUVOO DIV
01	127	1000	043	03	045	1235	4	01	NAUVOO
01	127	1000	043	03	050				OAKMAN DIV
01	127	1000	043	03	050	1290	4	02	OAKMAN
01	127	1000	043	03	055				PARRISH DIV
01	127	1000	043	03	055	1345	4	04	PARRISH
01	127	1000	043	03	060				SIPSEY DIV
01	127	1000	043	03	060	1587	4	02	SIPSEY
01	127	1000	043	03	065				TOWNLEY DIV
01	127	1000	043	03	070				WEST JASPER DIV
01	129		059	07					WASHINGTON
01	129		059	07	005				CHATOM DIV
01	129		059	07	005	0355	4	03	CHATOM
01	129		059	07	010				FRUITDALE DIV
01	129		059	07	013				MC INTOSH DIV
01	129		059	07	015				MILLRY DIV
01	129		059	07	015	1160	4	02	MILLRY
01	129		059	07	025				WAGARVILLE DIV
01	131		057	06					WILCOX
01	131		057	06	005				ALBERTA DIV
01	131		057	06	010				CAMDEN DIV
01	131		057	06	010	0290	4	04	CAMDEN
01	131		057	06	015				COY-FATAMA DIV
01	131		057	06	015	1770	4	02	VREDENBURGH (PART)
01	131		057	06	020				PINE APPLE DIV
01	131		057	06	020	1285	4	00	OAK HILL
01	131		057	06	020	1385	4	01	PINE APPLE
01	131		057	06	025				PINE HILL DIV
01	131		057	06	025	1390	4	02	PINE HILL
01	133		056	05					WINSTON
01	133		056	05	005				ADDISON DIV
01	133		056	05	005	0015	4	02	ADDISON
01	133		056	05	005	0077	4	00	ARLEY
01	133		056	05	010				DOUBLE SPRINGS DIV
01	133		056	05	010	0505	4	02	DOUBLE SPRINGS
01	133		056	05	015				HALEYVILLE DIV
01	133		056	05	015	0830	4	06	HALEYVILLE

GEOGRAPHIC CODES									NAME
STATE	COUNTY	SMSA	ESR	SEA	CCD	PLACE	PLACE DESC	PLACE SIZE	
01	133		056	05	020				LYNN DIV
01	133		056	05	020	1085	4	01	LYNN

GEOGRAPHIC CODES									NAME
STATE	COUNTY	SMSA	ESR	SEA	CCD	PLACE	PLACE DESC	PLACE SIZE	

GEOGRAPHIC CODES			NAME
COUNTY	CCD	PLACE	
067	005	0005	ABBEVILLE
073	005	0010	ADAMSVILLE
133	005	0015	ADDISON
065	035	0020	AKRON
117	030	0025	ALABASTER
095	005	0030	ALBERTVILLE
123	005	0035	ALEXANDER CITY
107	005	0040	ALICEVILLE
009	035	0045	ALLGOOD
055	005	0050	ALTOONA
039	005	0055	ANDALUSIA
015	005	0060	ANNISTON
015	035	0062	ANNISTON NORTHWEST (U)
095	010	0065	ARAB
083	015	0070	ARDMORE
045	005	0075	ARITON
133	005	0077	ARLEY
069	005	0080	ASHFORD
027	005	0085	ASHLAND
115	005	0090	ASHVILLE
083	005	0095	ATHENS
053	005	0100	ATMORE
055	010	0105	ATTALLA
081	005	0110	AUBURN
001	005	0115	AUTAUGAVILLE
069	005	0120	AVON
039	010	0125	BABBIE
109	005	0130	BANKS
003	005	0135	BAY MINETTE
097	005	0140	BAYOU LA BATRE
093	005	0150	BEAR CREEK
099	005	0155	BEATRICE
075	010	0160	BEAVERTON
085	005	0167	BENTON
057	005	0170	BERRY
073	010	0175	BESSEMER
001	010	0180	BILLINGSLEY
073	015	0185	BIRMINGHAM
061	015	0190	BLACK
009	005	0195	BLOUNTSVILLE
015	035	0200	BLUE MOUNTAIN
005	015	0205	BLUE SPRINGS
073	130	0207	BLUFF PARK (U)
095	015	0210	BOAZ (PART)
055	035	0210	BOAZ (PART)
063	005	0215	BOLIGEE
121	005	0220	BON AIR
115	025	0233	BRANCHVILLE
041	005	0235	BRANTLEY
007	005	0240	BRENT
053	010	0245	BREWTON
071	005	0250	BRIDGEPORT
073	020	0255	BRIGHTON
093	015	0260	BRILLIANT
073	005	0265	BROOKSIDE
073	080	0270	BROWNVILLE
109	010	0275	BRUNDIDGE
023	005	0280	BUTLER
117	005	0285	CALERA
131	010	0290	CAMDEN
123	010	0295	CAMP HILL
127	005	0300	CARBON HILL
073	005	0305	CARDIFF
039	020	0307	CAROLINA
107	010	0310	CARROLLTON
123	030	0315	CARRVILLE
035	005	0325	CASTLEBERRY
019	005	0330	CEDAR BLUFF
073	095	0335	CENTER POINT (U)
019	010	0340	CENTRE
007	010	0345	CENTREVILLE
129	005	0355	CHATOM
033	005	0360	CHEROKEE
097	010	0365	CHICKASAW
121	005	0370	CHILDERSBURG
097	015	0375	CITRONELLE
021	005	0380	CLANTON
005	010	0385	CLAYTON
009	020	0387	CLEVELAND
005	015	0390	CLIO
061	005	0395	COFFEE SPRINGS
025	005	0400	COFFEEVILLE
049	005	0405	COLLINSVILLE (PART)
019	015	0405	COLLINSVILLE (PART)
069	010	0410	COLUMBIA
117	015	0415	COLUMBIANA
127	010	0420	CORDOVA
069	015	0425	COTTONWOOD
073	085	0430	COUNTY LINE (PART)
009	030	0430	COUNTY LINE (PART)
079	035	0435	COURTLAND
069	005	0436	COWARTS
047	010	0437	CRAIG (U)
049	010	0440	CROSSVILLE
119	010	0445	CUBA
043	020	0450	CULLMAN
123	015	0455	DADEVILLE
045	020	0460	DALEVILLE
003	010	0465	DAPHNE
123	025	0470	DAVISTON
091	015	0475	DAYTON
103	015	0480	DECATUR
091	005	0485	DEMOPOLIS
075	010	0490	DETROIT
073	030	0492	DOCENA (U)
127	015	0495	DORA
069	020	0500	DOTHAN
133	010	0505	DOUBLE SPRINGS
041	005	0510	DOZIER
071	035	0513	DUTTON
053	015	0515	EAST BREWTON
051	010	0520	ECLECTIC
029	010	0525	EDWARDSVILLE
031	005	0530	ELBA
003	015	0535	ELBERTA
083	015	0540	ELKMONT
031	010	0545	ENTERPRISE
119	020	0550	EPES
107	015	0555	ETHELSVILLE
005	020	0560	EUFAULA
061	015	0565	EUNOLA
063	010	0570	EUTAW
103	020	0572	EVA
035	010	0575	EVERGREEN
099	010	0580	EXCEL
017	020	0585	FAIRFAX (U)
073	040	0590	FAIRFIELD
003	020	0595	FAIRHOPE
043	045	0597	FAIRVIEW
103	025	0600	FALKVILLE
091	015	0605	FAUNSDALE
057	010	0610	FAYETTE
017	005	0615	FIVE POINTS
127	030	0622	FLAT CREEK WEGRA PRACO (U) (PART)
073	005	0622	FLAT CREEK WEGRA PRACO (U) (PART)
103	015	0625	FLINT CITY
053	020	0630	FLOMATON
039	025	0635	FLORALA
077	010	0640	FLORENCE
003	025	0645	FOLEY
073	045	0647	FORESTDALE (U) (PART)
073	005	0647	FORESTDALE (U) (PART)
073	030	0647	FORESTDALE (U) (PART)
085	015	0650	FORT DEPOSIT
015	035	0652	FORT MC CLELLAN (U)
049	020	0655	FORT PAYNE
045	025	0657	FORT RUCKER (U)
099	010	0660	FRISCO CITY
029	005	0665	FRUITHURST
025	010	0670	FULTON
073	045	0675	FULTONDALE
049	025	0680	FYFFE
055	015	0685	GADSDEN
119	015	0690	GAINESVILLE
121	010	0695	GANTTS QUARRY
043	025	0700	GARDEN CITY
073	050	0705	GARDENDALE
019	005	0710	GAYLESVILLE
119	025	0715	GEIGER
061	010	0720	GENEVA
013	015	0725	GEORGIANA
049	030	0730	GERALDINE
023	010	0735	GILBERTOWN
093	025	0740	GLEN ALLEN (PART)
057	015	0740	GLEN ALLEN (PART)
055	020	0745	GLENCOE
041	010	0750	GLENWOOD
043	020	0752	GOOD HOPE
037	005	0755	GOODWATER
107	020	0760	GORDO
069	025	0765	GORDON
109	015	0770	GOSHEN
095	025	0775	GRANT
073	005	0780	GRAYSVILLE
065	005	0785	GREENSBORO
013	020	0790	GREENVILLE
045	015	0797	GRIMES
025	015	0800	GROVE HILL
093	020	0805	GUIN
003	025	0810	GULF SHORES

GEOGRAPHIC CODES			NAME
COUNTY	CCD	PLACE	
095	030	0815	GUNTERSVILLE
089	010	0817	GURLEY
093	020	0820	GU-WIN
093	025	0825	HACKLEBURG
067	010	0828	HALEBURG
133	015	0830	HALEYVILLE
093	030	0835	HAMILTON
049	050	0840	HAMMONDVILLE
043	025	0845	HANCEVILLE
117	035	0850	HARPERSVILLE
061	015	0855	HARTFORD
103	030	0860	HARTSELLE
009	025	0865	HAYDEN
085	020	0867	HAYNEVILLE
067	015	0870	HEADLAND
039	010	0875	HEATH
029	010	0880	HEFLIN
117	020	0885	HELENA
049	035	0886	HENAGAR
009	035	0887	HIGHLAND LAKE
079	010	0890	HILLSBORO
015	025	0895	HOBSON CITY
059	020	0900	HODGES
055	025	0905	HOKES BLUFF
043	030	0910	HOLLY POND
071	030	0915	HOLLYWOOD
073	060	0925	HOMEWOOD
073	130	0927	HOOVER
073	100	0930	HUEYTOWN
089	025	0935	HUNTSVILLE
113	015	0940	HURTSBORO
073	065	0945	IRONDALE
025	020	0950	JACKSON
015	015	0955	JACKSONVILLE
[illegible]	035	0960	JASPER
021	015	0965	JEMISON
127	005	0970	KANSAS
045	020	0972	KELLY
075	005	0975	KENNEDY
077	015	0980	KILLEN
073	085	0985	KIMBERLY
069	035	0990	KINSEY
031	030	0995	KINSTON
017	010	1000	LAFAYETTE
049	045	1002	LAKEVIEW
017	015	1005	LANETT
017	020	1010	LANGDALE (U)
117	010	1015	LEEDS (PART)
115	010	1015	LEEDS (PART)
073	075	1015	LEEDS (PART)
019	015	1017	LEESBURG
033	010	1020	LEIGHTON
083	030	1023	LESTER
045	020	1024	LEVEL PLAINS
077	020	1025	LEXINGTON
019	010	1027	LIBERTYVILLE
[illegible]	020	1030	LINCOLN
091	070	1035	LINDEN
077	010	1040	LINEVILLE
073	080	1045	LIPSCOMB
023	015	1050	LISMAN
017	015	1052	LITTLE SHAWMUT (U) (PART)
017	020	1052	LITTLE SHAWMUT (U) (PART)
033	025	1055	LITTLEVILLE
119	020	1060	LIVINGSTON
039	025	1065	LOCKHART
005	025	1070	LOUISVILLE
085	025	1072	LOWNDESBORO
003	035	1075	LOXLEY
041	010	1080	LUVERNE
133	020	1085	LYNN
013	015	1090	MC KENZIE
089	015	1095	MADISON
069	030	1100	MADRID
061	025	1105	MALVERN
021	020	1110	MAPLESVILLE
115	025	1115	MARGARET
105	015	1120	MARION
073	115	1125	MAYTOWN
049	050	1130	MENTONE
073	020	1135	MIDFIELD
045	015	1140	MIDLAND CITY
011	015	1145	MIDWAY
121	010	1150	MIGNON (U)
075	005	1155	MILLPORT
129	015	1160	MILLRY
097	030	1165	MOBILE
099	015	1170	MONROEVILLE
117	025	1175	MONTEVALLO
101	025	1180	MONTGOMERY

GEOGRAPHIC CODES			NAME
COUNTY	CCD	PLACE	
115	010	1183	MOODY
083	025	1185	MOORESVILLE
073	085	1190	MORRIS
079	020	1195	MOULTON
065	010	1200	MOUNDVILLE (PART)
125	010	1200	MOUNDVILLE (PART)
055	035	1202	MOUNTAINBORO
073	090	1205	MOUNTAIN BROOK
097	035	1215	MOUNT VERNON
073	025	1220	MULGA
033	015	1225	MUSCLE SHOALS
091	020	1230	MYRTLEWOOD
127	045	1235	NAUVOO
065	020	1240	NEWBERN
031	035	1245	NEW BROCKTON
089	040	1250	NEW HOPE
123	025	1253	NEW SITE
049	045	1254	NEWSOME
045	020	1255	NEWTON
067	020	1260	NEWVILLE
073	105	1270	NORTH JOHNS
125	045	1275	NORTHPORT
087	015	1280	NOTASULGA (PART)
081	015	1280	NOTASULGA (PART)
121	010	1282	OAK GROVE
131	020	1285	OAK HILL
127	050	1290	OAKMAN
115	025	1295	ODENVILLE
015	020	1300	OHATCHEE
009	035	1305	ONEONTA
081	020	1310	OPELIKA
039	030	1315	OPP
047	015	1320	ORRVILLE
089	040	1324	OWENS CROSSROADS
015	025	1325	OXFORD
045	025	1330	OZARK
071	015	1335	PAINT ROCK
127	055	1345	PARRISH
117	020	1347	PELHAM
115	015	1350	PELL CITY
041	015	1360	PETREY
113	025	1365	PHENIX CITY
059	005	1370	PHIL CAMPBELL
107	010	1373	PICKENSVILLE
015	030	1375	PIEDMONT
045	015	1380	PINCKARD
131	020	1385	PINE APPLE
131	025	1390	PINE HILL
071	020	1395	PISGAH
073	115	1405	PLEASANT GROVE
053	010	1410	POLLARD
001	020	1415	PRATTVILLE
097	040	1420	PRICHARD
115	020	1425	RAGLAND
115	005	1430	RAINBOW CITY (PART)
055	040	1430	RAINBOW CITY (PART)
049	045	1435	RAINSVILLE
029	[illegible]	1445	RANBURNE
059	010	1450	RED BAY
039	[illegible]	1455	RED LEVEL
055	010	1460	REECE CITY
107	030	1465	REFORM
035	020	1470	REPTON
039	035	1475	RIVER FALLS
115	015	1480	RIVERSIDE
017	020	1485	RIVER VIEW (U)
053	015	1488	RIVERVIEW
111	010	1490	ROANOKE
003	035	1495	ROBERTSDALE
037	010	1500	ROCKFORD
077	030	1505	ROGERSVILLE
073	020	1507	ROOSEVELT
059	015	1510	RUSSELLVILLE
[illegible]	020	1515	RUTLEDGE
061	020	1520	SAMSON
039	010	1525	SANFORD
097	045	1530	SARALAND
055	035	1532	SARDIS
097	045	1535	SATSUMA
071	030	1540	SCOTTSBORO
071	035	1550	SECTION
047	035	1555	SELMA
047	010	1557	SELMONT WEST SELMONT (U)
017	020	1560	SHAWMUT (U)
033	020	1565	SHEFFIELD
023	[illegible]	1570	SILAS
117	030	1575	SILURIA
003	035	1580	SILVERHILL
127	060	1582	SIPSEY
061	025	1585	SLOCOMB

GEOGRAPHIC CODES			NAME
COUNTY	CDD	PLACE	
009	015	1587	SNEAD
103	040	1590	SOMERVILLE
055	020	1595	SOUTHSIDE
003	010	1602	SPANISH FORT (U)
115	025	1610	SPRINGVILLE
115	005	1615	STEELE
071	040	1620	STEVENSON
075	010	1625	SULLIGENT
127	015	1630	SUMITON
003	045	1635	SUMMERDALE
091	025	1637	SWEET WATER
121	045	1645	SYLACAUGA
049	045	1648	SYLVANIA
073	115	1650	SYLVAN SPRINGS
121	050	1655	TALLADEGA
121	010	1660	TALLADEGA SPRINGS
051	020	1665	TALLASSEE (PART)
123	030	1665	TALLASSEE (PART)
073	125	1670	TARRANT CITY
069	030	1672	TAYLOR
091	030	1675	THOMASTON
025	030	1680	THOMASVILLE
021	015	1685	THORSBY
079	035	1690	TOWN CREEK
023	010	1695	TOXEY
073	085	1700	TRAFFORD
089	005	1702	TRIANA
103	015	1705	TRINITY
109	030	1710	TROY
073	065	1715	TRUSSVILLE
125	060	1720	TUSCALOOSA
033	025	1725	TUSCUMBIA
087	025	1730	TUSKEGEE
095	040	1732	UNION GROVE
011	020	1735	UNION SPRINGS
105	025	1740	UNIONTOWN
049	050	1745	VALLEY HEAD
075	015	1750	VERNON
073	130	1755	VESTAVIA HILLS
059	020	1760	VINA
117	035	1765	VINCENT
043	050	1767	VINEMONT
099	030	1770	VREDENBURGH (PART)
131	015	1770	VREDENBURGH (PART)
111	015	1775	WADLEY
055	005	1780	WALNUT GROVE
073	135	1785	WARRIOR
077	040	1790	WATERLOO
017	030	1795	WAVERLY (PART)
081	015	1795	WAVERLY (PART)
015	035	1800	WEAVER
069	035	1805	WEBB
111	020	1810	WEDOWEE
007	020	1815	WEST BLOCTON
015	045	1822	WEST END-COBB TOWN (U)
093	030	1823	WESTON
073	005	1823	WEST JEFFERSON
051	030	1825	WETUMPKA
115	010	1827	WHITES CHAPEL
117	040	1830	WILSONVILLE
117	025	1835	WILTON
093	035	1840	WINFIELD (PART)
057	020	1840	WINFIELD (PART)
111	025	1843	WOODLAND
071	015	1845	WOODVILLE
119	030	1850	YORK

Appendix C
Job Control Language (JCL)

EXPLANATION OF JOB CONTROL LANGUAGE (JCL) CARDS

```
//JNAMEɃJOBɃ(IED13,9R),'NAME',REGION=128K
/*JOBPARMɃTIME=00059,LINES=3K
```

The two JØB cards are the first two cards in the program. They are used to inform the system of which account should receive charges for paper and CPU time, as well as describing the attributes and limits pertaining to the job being run. In the above example JNAME is a name given to a job by the user. It should begin with a letter and range from one to eight alphanumeric characters in length. The character Ƀ represents a blank space (use the space bar). In parenthesis are the account number (IED13) and the return storage bin number (9R) where the program printout can be stored until retrieved. The name (NAME) of the programmer is placed in single quotes and followed by the REGION size for the program. The second card contains the time limit (TIME=00059) [TIME=mmmss, where mmm minutes and ss seconds must be specified] and the pages limit (LINES=nK) [LINES=nK will yield n times 1000 lines at 60 lines per page].

```
//ɃEXECɃPGM=CENSLIST,REGION=128K,PARM='MAX_CCDS=
    XXX/ISASIZE(8K)'
```

The main function of the EXEC statement is to identify the program to be executed or the catalogued procedure to be used. In the statement above PGM= CENSLIST specifies that the program named CENSLIST is to be executed. CENSLIST is found in a private library (a partitioned data set that stores programs not used sufficiently to warrant their inclusion in the system library). A private library is indicated as the storage place for CENSLIST by the DD statement immediately following the EXEC card. The characters REGION = specifies the amount of main memory needed for the program to execute, in this case, 128K bytes of main memory. This amount of memory will have to be varied in accordance with the maximum number of CCD's specified by PARM = 'MAX_CCDS=XXX', where XXX is the number of CCD's to retrieve during a search. For example, if it was expected that seventy-five CCD's might fit the attributes to be covered by the search, this segment of the EXEC card would contain 'MAX_CCD=75'.

```
//STEPLIBbDDbDSNAME=IED13.CENSLIB,DISP=SHR
```

The STEPLIBbDD statement defines the private library to be used by the preceding EXEC card reference. DSNAME defines the location of the library. In this case, the library is found under the name of CENSLIB on the account number IED13, 'DISP'= describes the data set's disposition. In this case, SHR indicates that jobs that are executing concurrently within this job step may simultaneously use or "share" the data set.

```
//ISAM4BPbDDbDSNAME=IED13.ISAM4BP,DISP=SHR
//CHARHEADbDDbDSNAME=IED13.CHARHEAD,DISP=SHR
//HEADINGSbDDbDSNAME=IED13.HEADINGS,DISP=SHR
```

The above three statements describe the data sets ISAM4BP,CHARHEAD, and HEADINGS which are referenced by the program described in the EXEC statement. ISAM4BP is the indexed sequential data base, keyed by COUNTY-CCD-RECORD-TYPE. CHARHEAD is a file of headings for the search requests and HEADINGS is a file of headings for the tables. DCB=BUFNØ=1 describes the number of buffers to be assigned to the data control block. In the above three cases, one buffer is allocated.

```
//SYSPRINTbDDbSYSOUT=A
```

The above statement indicates that output from the program executing in the EXEC statement is to appear on the printer (SYSOUT=A signifies the printer) unless otherwise specified.

```
//INPUTbDDb*
```

This statement indicates to the program executing in the EXEC statement that data cards are immediately following (indicated by'*'). A reference to INPUT during execution of the program will cause these cards to be read. Punched cards containing request set keywords and values are placed at this point.

```
//
```

This card indicates to the system the end of the job.

Appendix D
Example Job Decks and Listings

EXAMPLE USES OF CENSLIST

The following deck of cards (also see figure 10) will produce the illustrated * output which contains an example of table building, and example of table aggregation, and an example of a search:

```
//BEH JOB (IEDle,9R),'CENSLIST SAMPLE',REGION=128K
 /*JOBPARM TIME=0010,LINES=3K
// EXEC PGM=CENSLIST,PARM='ISASIZE(8K)',REGION=128K
//STEPLIB DD DSNAME=IED13.CENSLIB,DISP=SHR
//HEADINGS DD DSNAME=IED13,HEADINGS,DISP=SHR
//CHARHEAD DD DSNAME=IED13.CHARHEAD,DISP=SHR
//ISAM4BP DD DSNAME=IED13.ISAM4BP,DISP=SHR
//SYSPRINT DD SYSOUT=A
//INPUT DD *
     COUNTY='1' CCD='5' RECORD_TYPE='1' TABLES='17';
     COUNTY='1,1' CCD='5,10' RECORD_TYPE='1,1'
          TABLES='16'
     AGGREGATE='YES';
     CHARACTERISTIC='1,32' LEVEL='50' SEARCH='YES';
//
```

TABLE 17 AUTAUGA COUNTY, CENSUS DIVISION 5, TOTAL POPULATION, PERSONS BY AGE AND SEX

MALE	FEMALE	AGE
109	101	UNDER 3
60	41	3-4
31	56	5
40	40	6
108	109	7-9
164	123	10-13
50	15	14
23	36	15
44	57	16
28	35	17
41	12	18
14	33	19
24	29	20
17	18	21
44	42	22-24
62	79	25-29
78	83	30-34
44	74	35-39
54	60	40-44
84	58	45-49
65	66	50-54
60	58	55-59
25	40	60-61
15	32	62-64
60	66	65-69
25	60	70-74
40	34	75 AND OVER

TABLE 16 AS AN AGGREGATE OF THESE COUNTY-CCD-RECORD TYPES AUTAUGA - 5 - TOTAL POPULATION AUTAUGA - 10 - TOTAL POPULATION AGGREGATE $ INCOME DEFICIT BETWEEN SPECIFIED POVERTY LEVEL AND TOTAL INCOME FOR FAMILIES AND UNRELATED INDIVIDUALS

LESS THAN 75% OF POVERTY LEVEL	LESS THAN 125% OF POVERTY LEVEL	
36424	111585	FAMILY
13550	32880	UNRELATED INDIVIDUAL

SEARCH FOR CCD'S IN WHICH PERSONS 18 YEARS OLD OR YOUNGER AS A PERCENT OF ALL PERSONS EXCEED 50.0%

COUNTY	CCD		COUNTY	CCD	
BULLOCK	15	53.8%	DALLAS	5	51.4%
DALLAS	15	50.7%	GREENE	15	50.2%
HALE	25	53.8%	LOWNDES	5	52.2%
LOWNDES	10	54.8%	MACON	30	53.1%
SUMTER	25	52.8%	TALLADEGA	30	51.3%

*In an effort to show the output on the size paper used in this manual, some liberties have been taken in rearranging the output information (e.g. two lines where only one is needed on the computer output). In addition, a standard set of DAULIST footnotes is printed by CENSLIST. These have been omitted from this sample display.

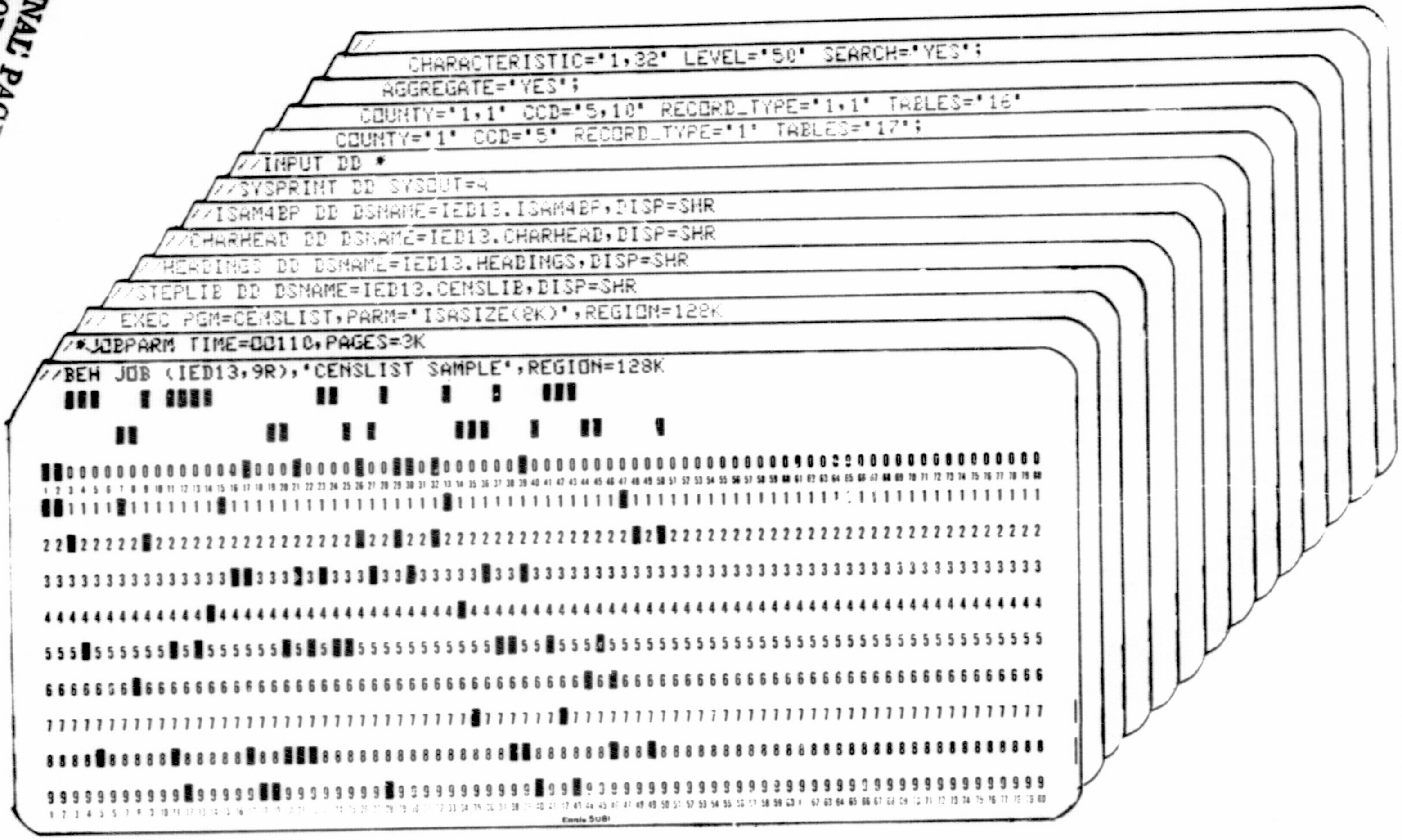

//
CHARACTERISTIC='1,32' LEVEL='50' SEARCH='YES';
AGGREGATE='YES';
COUNTY='1,1' CCD='5,10' RECORD_TYPE='1,1' TABLES='16'
COUNTY='1' CCD='5' RECORD_TYPE='1' TABLES='17';
//INPUT DD *
//SYSPRINT DD SYSOUT=A
//ISAM4BP DD DSNAME=IED13.ISAM4BP,DISP=SHR
//CHARHEAD DD DSNAME=IED13.CHARHEAD,DISP=SHR
//HEADINGS DD DSNAME=IED13.HEADINGS,DISP=SHR
//STEPLIB DD DSNAME=IED13.CENSLIB,DISP=SHR
// EXEC PGM=CENSLIST,PARM='ISASIZE(8K)',REGION=128K
/*JOBPARM TIME=00110,PAGES=3K
//BEH JOB (IED13,9R),'CENSLIST SAMPLE',REGION=128K

Figure 10

EXAMPLE USES OF HOUSLIST

The following deck of cards (also see figure 11) will produce the illustrated output. The sample output contains an example of table building, an example of table aggregation, and an example of search:

```
//BEH JOB (IED13,9R),'HOUSLIST SAMPLE',REGION=128K
 /*JOBPARM TIME=00100,LINES=3K
// EXEC PGM=HOUSLIST,PARM='ISASIZE(8K)',REGION=128K
//STEPLIB DD DSNAME=IED13.HOUSLIB, DISP=SHR
//HEADINGS DD DSNAME=IED13.HEAD4BH,DISP=SHR
//CHARHEAD DD DSNAME=IED13.CHEAD4BH,DISP=SHR
//ISAM4BH DD DSNAME=IED13.ISAM4BH,DISP=SHR
//SYSPRINT DD SYSOUT=A
//INPUT DD *
    COUNTY='49' CCD='40' RECORD_TYPE='1' TABLES='35';
    COUNTY='49,49' CCD='40,45' record-type='1,1'
        TABLES='35'
    AGGREGATE='YES';
    CHARACTERISTIC='47,2' LEVEL='95' SEARCH='YES';
//
```

TABLE 35 MOBILE COUNTY, CENSUS DIVISION 40, TOTAL POPULATION COUNT OF OCCUPIED AND VACANT YEAR-ROUND HOUSING UNITS BY OCCUPANCY/VACNCY STATUS

```
    11729     OCCUPIED
      616     VACANT YEAR-ROUND: FOR RENT
      133     FOR SALE ONLY
       57     RENTED OR SOLD, NOT OCCUPIED
       34     FOR OCCASIONAL USE
      205     OTHER VACANT
```

TABLE 35 AS AN AGGREGATE OF THESE COUNTY-CCD-RECORD TYPES MOBILE - 40-TOTAL POPULATION MOBILE - 45-TOTAL POPULATION COUNT OF OCCUPIED AND VACANT YEAR-ROUND HOUSING UNITS BY OCCUPANCY/VACNCY STATUS

```
    15680     OCCUPIED
      669     VACANT YEAR-ROUND: FOR RENT
      164     FOR SALE ONLY
       73     RENTED OR SOLD, NOT OCCUPIED
       46     FOR OCCASIONAL USE
      267     OTHER VACANT
```

SEARCH FOR CCD'S IN WHICH RENTER OCCUPIED LACKING PLUMBING AS A PERCENT OF RENTER OCCUPIED EXCEED 95.0%

```
COUNTY     CCD               COUNTY     CCD
LOWNDES     10    96.0%      MACON       30    100.0%

COUNTY     CCD
WILCOX       5    95.5%
```

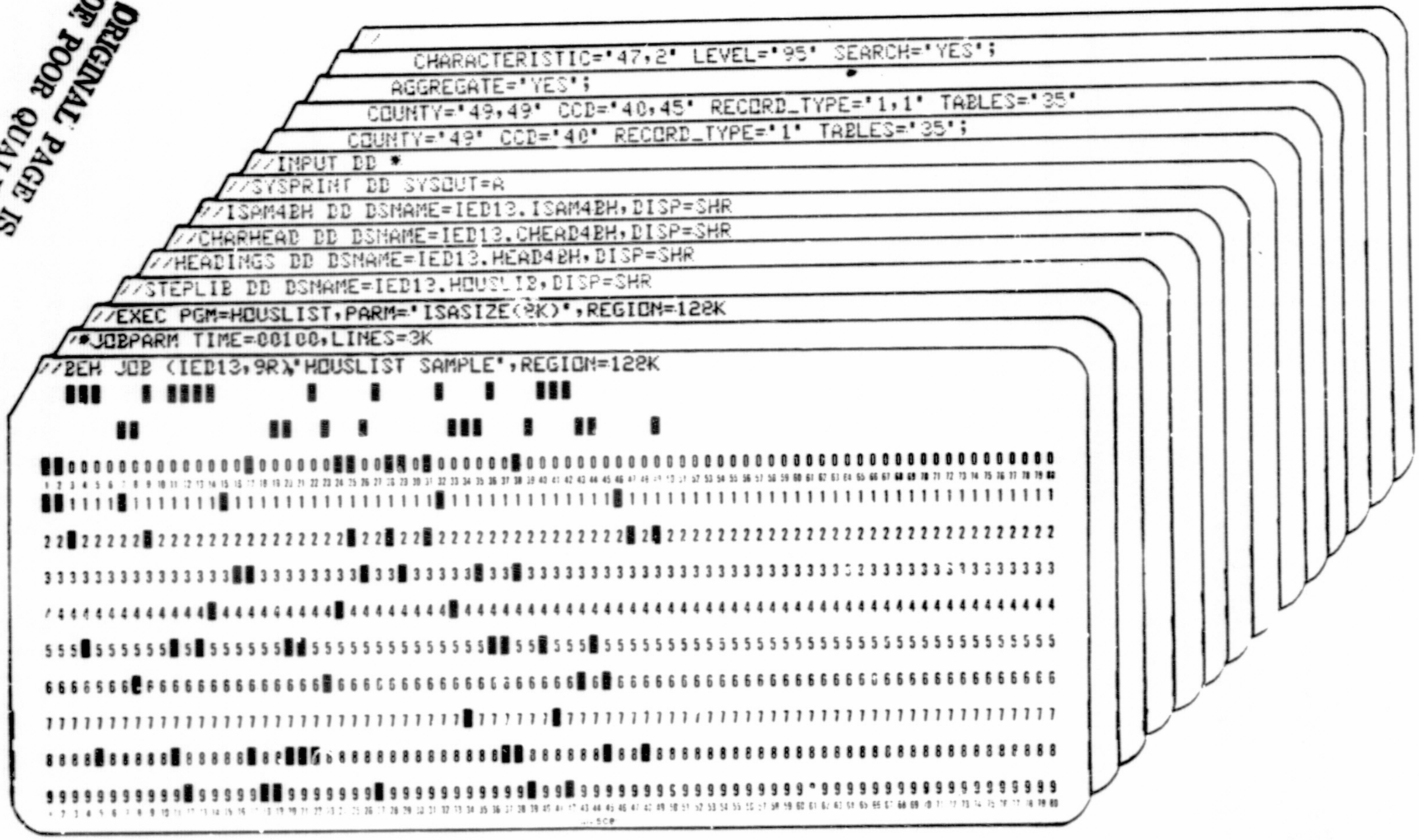

//
CHARACTERISTIC='47,2' LEVEL='95' SEARCH='YES';
AGGREGATE='YES';
COUNTY='49,49' CCD='40,45' RECORD_TYPE='1,1' TABLES='35'
COUNTY='49' CCD='40' RECORD_TYPE='1' TABLES='35';
//INPUT DD *
//SYSPRINT DD SYSOUT=A
//ISAM4BH DD DSNAME=IED13.ISAM4BH,DISP=SHR
//CHARHEAD DD DSNAME=IED13.CHEAD4BH,DISP=SHR
//HEADINGS DD DSNAME=IED13.HEAD4BH,DISP=SHR
//STEPLIB DD DSNAME=IED13.HOUSLIB,DISP=SHR
//EXEC PGM=HOUSLIST,PARM='ISASIZE(8K)',REGION=128K
/*JOBPARM TIME=00100,LINES=3K
//BEH JOB (IED13,9R),'HOUSLIST SAMPLE',REGION=128K

Figure 11

Appendix E
Error Messages

ERROR MESSAGES AND THEIR PROBABLE CAUSES

1. *RECORD TYPE SPECIFIED DOES NOT EXIST FOR THIS CCD, OR CCD SPECIFIED DOES NOT EXIST IN COUNTY SPECIFIED.

   Cause: A table building or aggregating request either asked for a record type (e.g., negro population) which is not present for that particular CCD, <u>or</u> the CCD code is out of the range of possible CCD's for a county.

   This error message is accompanied by one of the following, depending on whether the request was for
   Table Building:
   *TABLE iii HAS BEEN OMITTED FOR COUNTY-CCD-RECORD-TYPE aaa-bbb-ccc.
   or Aggregating:
   *COUNTY-CCD-RECORD-TYPE aaa-bbb-ccc OMITTED FROM THIS AGGREGATION

2. *COUNTY-CCD-RECORD-TYPE aaa-bbb-ccc OMITTED FROM THIS AGGREGATION BECAUSE OF DATA SUPPRESSION.

   Cause: If during an aggregate request, a table is encountered in which the data was suppressed, the table was left out of the aggregation.

   *TABLE iii OMITTED BECAUSE OF DATA SUPPRESSION

   Cause: Same as above. See <u>Census User's Guide</u> for complete details on data suppression.

2(a). *COUNTY-CCD-RECORD_TYPE aaa-bbb-ccc OF THIS AGGREGATION CONTAINS SUPPRESSED DATA.

   Cause: Some portion of the table for this county-ccd-record type is suppressed, but was included in the aggregation anyway. This means that any of the aggregated values might be in error. List the tables separately to find exactly where the suppression occurred. This message is particular to the housing program.

3. TABLE iii DOES NOT EXIST FOR RECORD_TYPE jjj IN COUNTY-CCD aaa-bbb, IGNORED.

   Cause: Tables 1 → 99 exist for record-types 1, 2, 3, & 4.
   Tables 100 → 127 exist for record-type 13.
   If, for example, you ask for table 110 for record-type 1, this message appears.

4. *UNREAL COUNTY, CCD, RECORD_TYPE, CHARACTERISTIC, LEVEL OR TABLE NUMBER FOUND. REQUEST IGNORED.

Cause: Could be caused by any number of things; in general, appears after checking input data (request sets) for validity. Specifically, this message will appear if any of the following is true:

Any county > 67
record-type not equal 1 or 2 or 3 or 4 or 13 for
    population data; 1, 2, 7, 8, 9, 10 for
    housing data
CCD not a multiple of five
table number greater than 127 for population data;
    200 for housing data

These two items make up characteristic	category less than or equal 0 or category greater than 42, base less than or equal 0 or base greater than 42
	level less than 0 or level greater than 100

MISCELLANEOUS SYSTEM ERRORS THAT MIGHT OCCUR:

SYSTEM 80A or 804
    Cause: You've run out of memory space. Increase region = parameter on job card.

SYSTEM 322
    Cause: You've run out of time. Increase time = parameter on job card.

SYSTEM 222
    Cause: You've run out of pages. Increase lines = parameter on job card.

(somename (e.g., ISAM4BP) DD card missing.
    Cause: You've left out a DD (data definition) card from your deck. Check it for correctness.

Appendix F
Search Characteristics

LIST OF CENSLIST SEARCH CHARACTERISTICS

Characteristic No. /*Data Items*/	Description
1	Persons 18 Years Old or Younger
2	Persons 19 to 44 Years Old
3	Persons 45 to 64 Years Old
4	Persons 65 Years or Older
5	Persons from a Different State
6	Persons Who work Outside County of Residence
7	Persons With at Least 4 Years of High School
8	Persons With at Least 4 Years of College
9	Persons With Vocational Training
10	Persons in Labor Force
11	Persons in Labor Force, Unemployed
12	Professional, Technical, or Kindred Workers
13	Craftsmen, Foremen, or Kindred Workers
14	Operatives, Except Transport
15	Service Workers, Except Private Household
16	Professional, Technical, or Kindred Workers
17	Craftsmen, Foremen, or Kindred Workers
18	Operatives, Except Transport
19	Service Workers, Except Private Household
20	Persons Employed in Agriculture, Forestry, or Fisheries
21	Persons Employed in Mining
22	Persons Employed in Construction
23	Persons Employed in Manufacturing
24	Persons Employed in Transportation, Communications, or Utilities
25	Persons Employed in Wholesale or Retail Trade
26	Persons Employed in Finance, Insurance, or Real Estate

27	Persons Employed in Any Type of Service
28	Persons Employed in Public Administration
29	Families with Income Less than $3,000
30	Families with Income Less than $7,000
31	Families with Income Less than Poverty Level

/*Base Items*/

32	All Persons
33	Persons 5 Years Old or Older
34	Persons at Work During the Census Week
35	Persons 25 Years Old or Older
36	Persons 16 to 64 Years Old with Less than 3 Years of College
37	Persons 16 Years Old or Older
38	Persons 16 Years Old or Older in Labor Force
39	Employed Persons 16 Years Old or Older
40	Employed Females 16 Years Old or Older
41	All Families
42	Aggregate $ Income?

LIST OF HOUSLIST SEARCH CHARACTERISTICS

Character-istic No. /*Data Items*/	Description
1	Owner Occupied
2	Renter Occupied
3	Negro Occupied
4	Vacant For Sale
5	Vacant for Rent
6	Occupied Units in Structure Built in 1939 or Before
7	Vacant Units in Structure Built in 1939 or Before

8	Occupied Units in Structure Built in 1960 or After
9	Vacant Units in Structure Built in 1960 or After
10	Occupied one Unit, Detached
11	Vacant one Unit, Detached
12	Occupied Mobile Homes
13	Occupied Units on Public Water System or Private Company
14	Occupied Units with Individual Well
15	Occupied Units on Public Sewer
16	Occupied Units with Septic Tank or Cesspool
17	Occupied Units with no Automobiles
18	Occupied Units with Central or Unit Air Conditioning
19	Occupied Units with Heating Fuel-Utility Gas
20	Occupied Units with Heating Fuel-Bottled, Tank, or LP
21	Occupied Units with Heating Fuel-Electricity
22	Owner Occupied with one or no Bedroom
23	Negro Owner Occupied with one or no Bedroom
24	Renter Occupied with one or no Bedroom
25	Negro Renter Occupied Units with one or no Bedroom
26	Vacant Units with one or no Bedroom
27	One Person Unit
28	Five or more Persons Unit
29	Negro Five or more Persons Units
30	Eight or more Persons Unit
31	Negro Eight or more Persons Units
32	Occupied Husband-Wife Family 65+ Years Old
33	Male/Female Primary Individual -- 65+ Years Old
34	Owner Occupied with 1.5 or more Persons/Room
35	Renter Occupied with 1.5 or more Persons/Room

36	Negro Occupied with 1.5 or more Persons/Room
37	Owner Occupied with Value Under $5,000
38	Negro Owner Occupied with Value Under $5,000
39	Owner Occupied with Value Under $7,500
40	Negro Owner Occupied with Value Under $7,500
41	Renter Occupied with Gross Rent Under $40
42	Negro Renter Occupied with Gross Rent Under $40
43	Renter Occupied with Gross Rent Under $80
44	Negro Renter Occupied with Gross Rent Under $80
45	Owner Occupied Lacking Plumbing
46	Negro Owner Occupied Lacking Plumbing
47	Renter Occupied Lacking Plumbing
48	Negro Renter Occupied Lacking Plumbing
49	Occupied Lacking Plumbing with 1.5 or more Persons per Room
50	Negro Occupied Lacking Plumbing with 1.5 or more Persons/Room
51	Owner Occupied with Income Under $3,000 and Unit Valued Less than $5,000
52	Negro Owner Occupied with Income Under $3,000 and Unit Value Less than $5,000
53	Owner Occupied with Income Under $3,000 and Unit Valued Less than $10,000
54	Negro Owner Occupied W/Income Under $3,000 and Unit Valued Less than $10,000
55	Renter Paying 25+ Percent of Income as Rent for Rents Under $40
56	Negro Renter Paying 25+ Percent of Income as Rent for Rents Under $40
57	Renter Paying 25+ Percent of Income as Rent for Rents Under $80
58	Negro Renter Paying 25+ Percent of Income as Rent for Rents Under $80
59	Occupied Lacking one or more Plumbing for Income Under $3,000
60	Negro Occupied Lacking one or more Plumbing for Income Under $3,000

/*Base Items*/

61	All Occupied Units
62	All Units
63	All Vacant Units
64	Owner Occupied Units
65	Negro Owner Occupied Units
66	Renter Occupied Units
67	Negro Renter Occupied Units
68	Negro Occupied Units

LIST OF PARTICIPANTS

Karen Crawford
Dr. Cyrus Dawsey
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Dr. David Icenogle
Kathy Phifer
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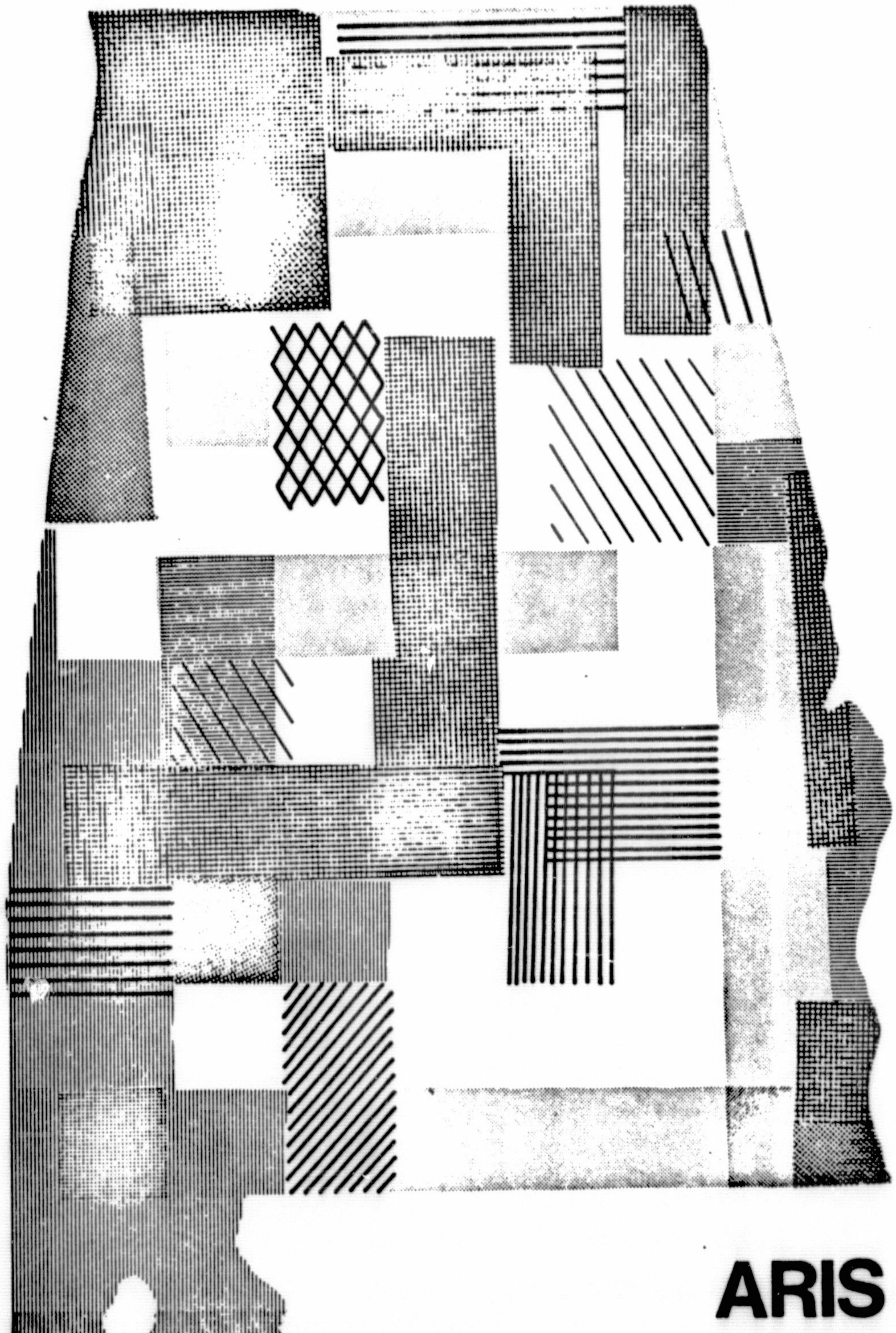
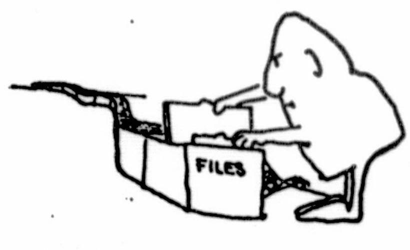
Dr. Reginald Vachon
Federico Leon de la Vega L.
Karen Winkler
G. Barri Wysong
Linda Young

APPENDIX E

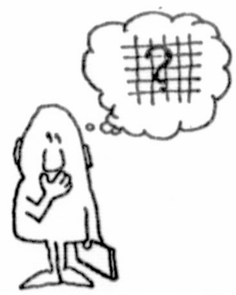
PRESENTATION AIDS

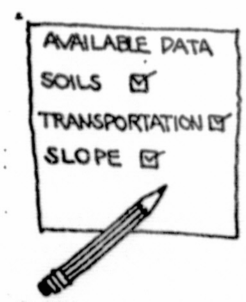


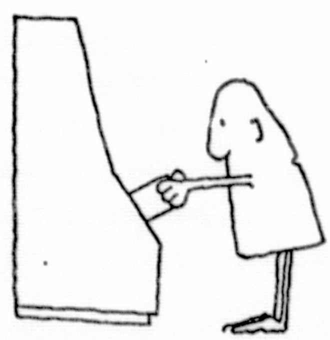
ARIS

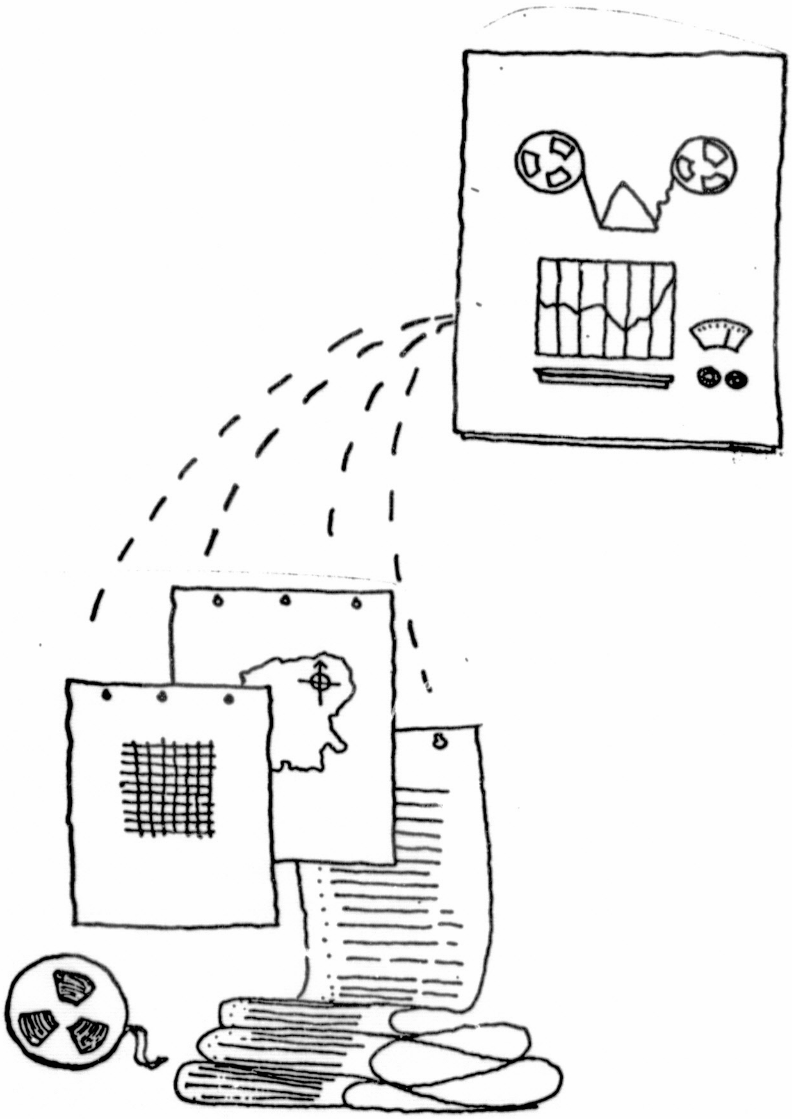

FILES


ARIS




AVAILABLE DATA
SOILS
TRANSPORTATION
SLOPE





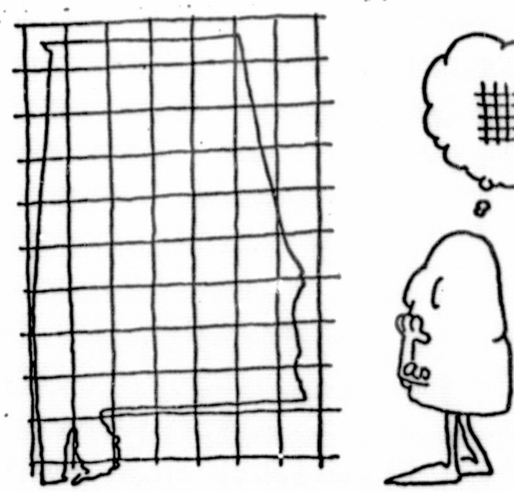
ARIS STRUCTURE AND PHASES OF DEVELOPMENT

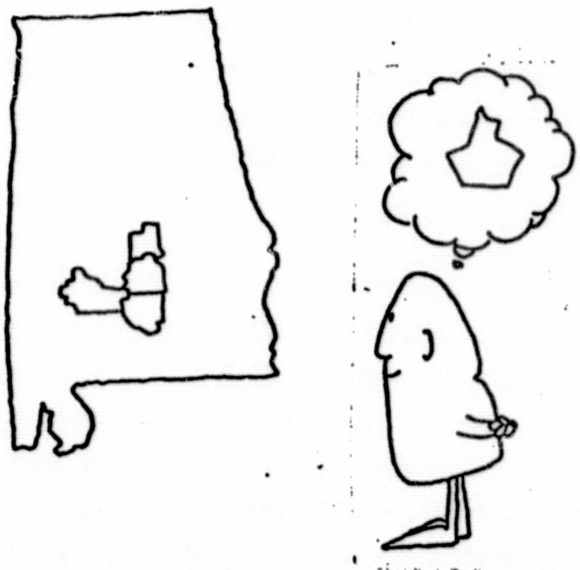
ARIS

PHASES OF DEVELOPMENT	DATA BASES	PROGRAMS
ARIS I (complete)	Grid Base	FILGEN GRID-GRIDGRAPHIC FLEXIN GRID MERGE MULTIFLEX MAPMERGE WINDOW SEARCH GRID PLOT
	Polygon Base	BASE MAP AREA MAP CONTOUR/PROXIMAL MAP
	Census Base	CENSLIST HOUSLIST
ARIS II (presently being implemented)		USER AID PROGRAM
ARIS III (not developed yet)	Bibliographic Base	

ARIS I

Grid Base



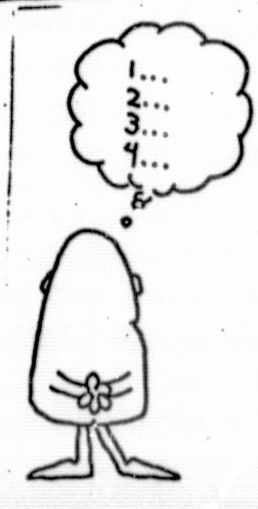


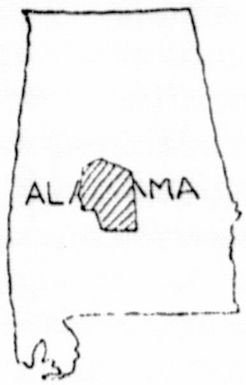
Polygon Base

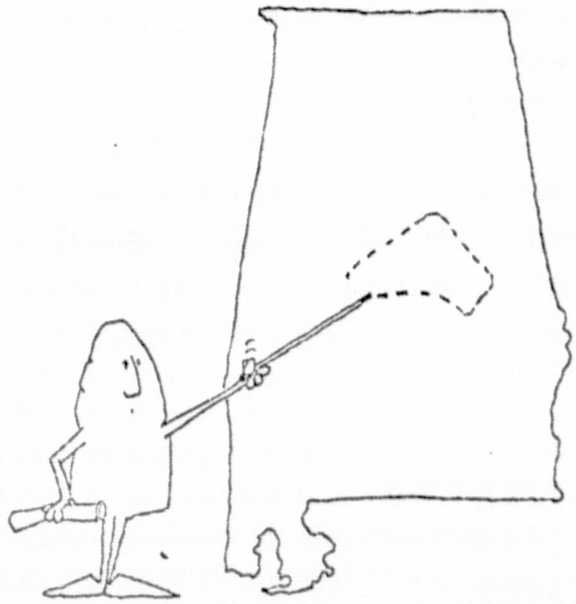
Table (Blank) County, Census Division 5, Total Population By Age and Se[illegible]

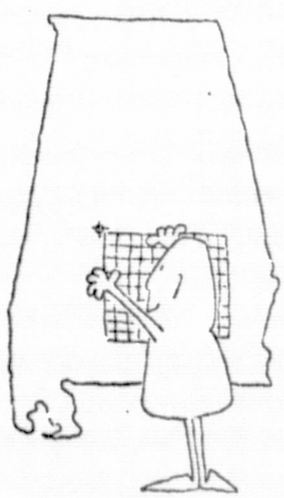
Male	Female	Under 3
109	101	3-4
60	41	5
31	56	6
108	119	7-9
---	---	---

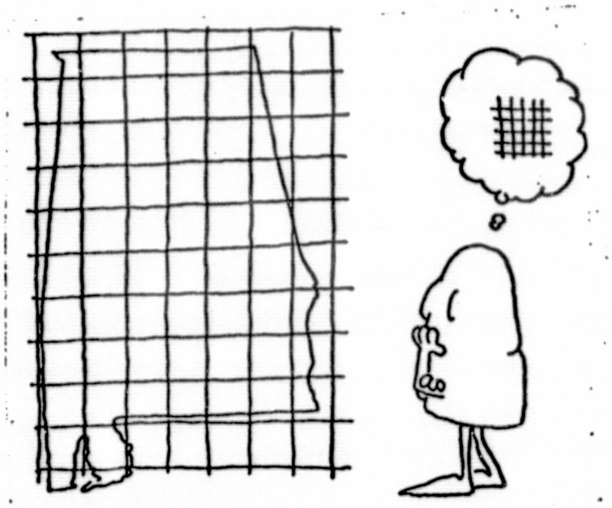
Census Base

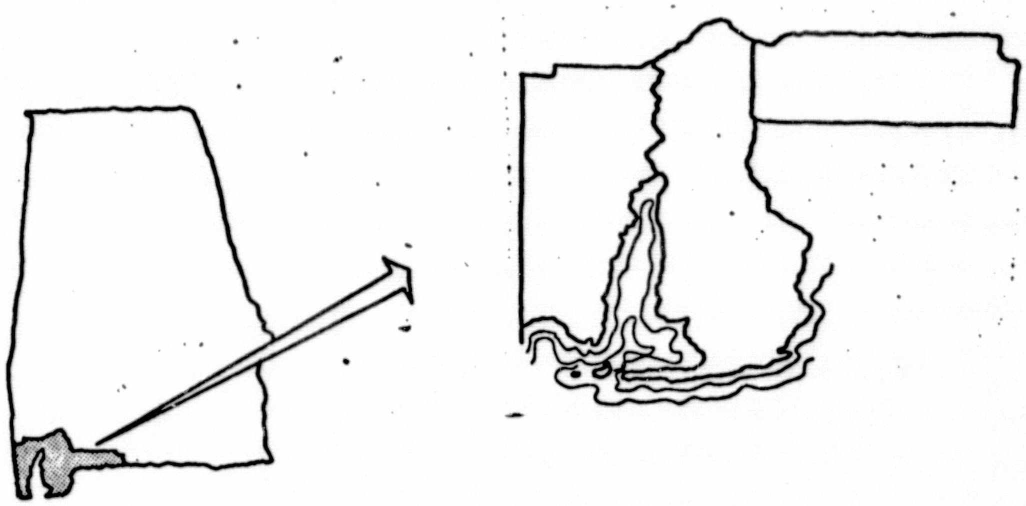


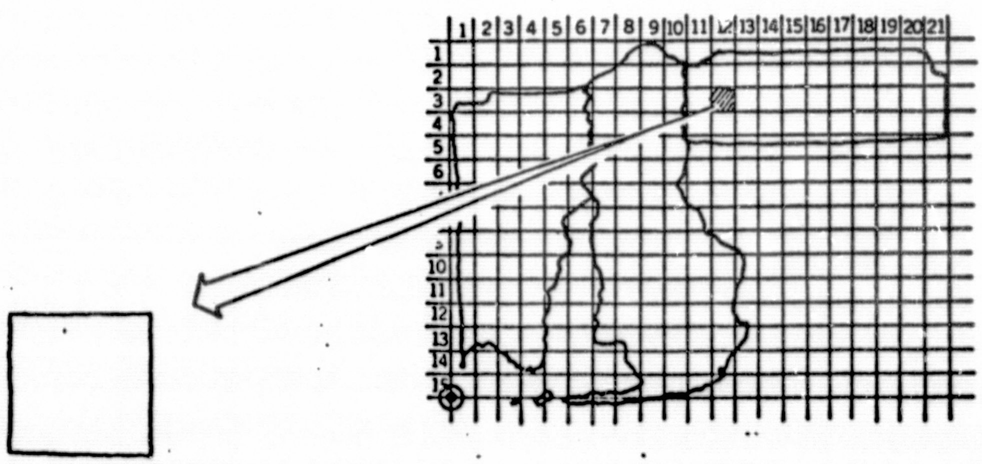

AL MA





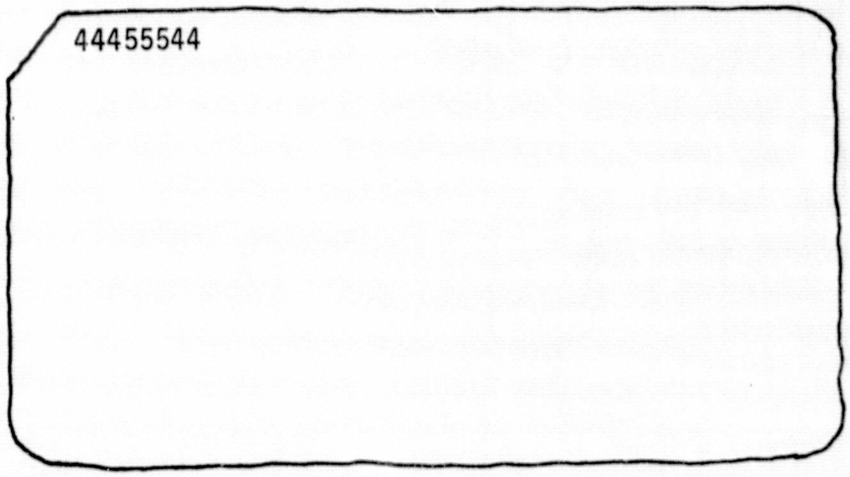




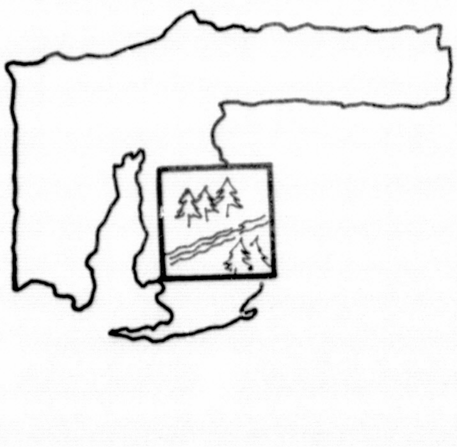


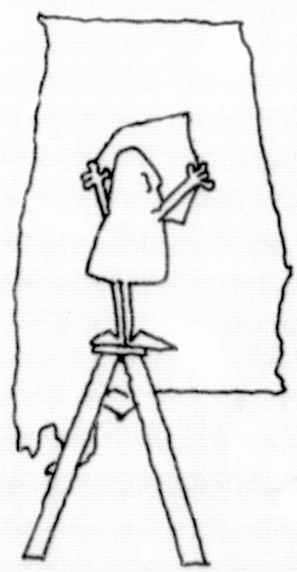
CELL (3,12)

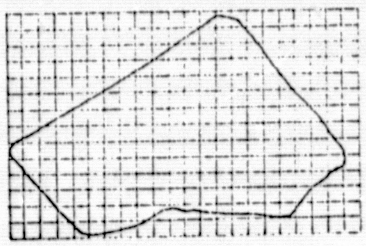
This cell is taken from row 3 and column 12.

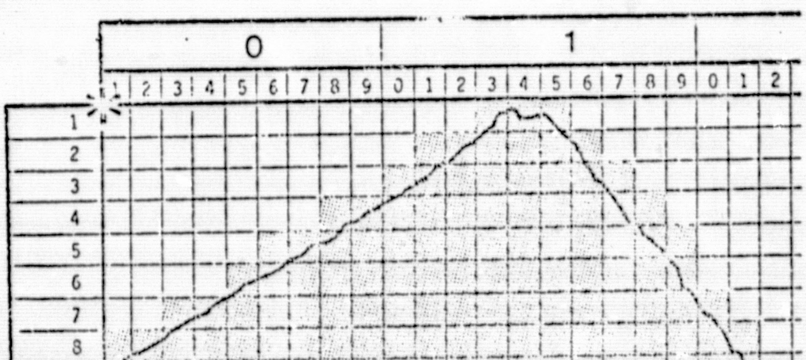


SOIL NUMBERS shown recorded for
cells (1,1) through (1,8).





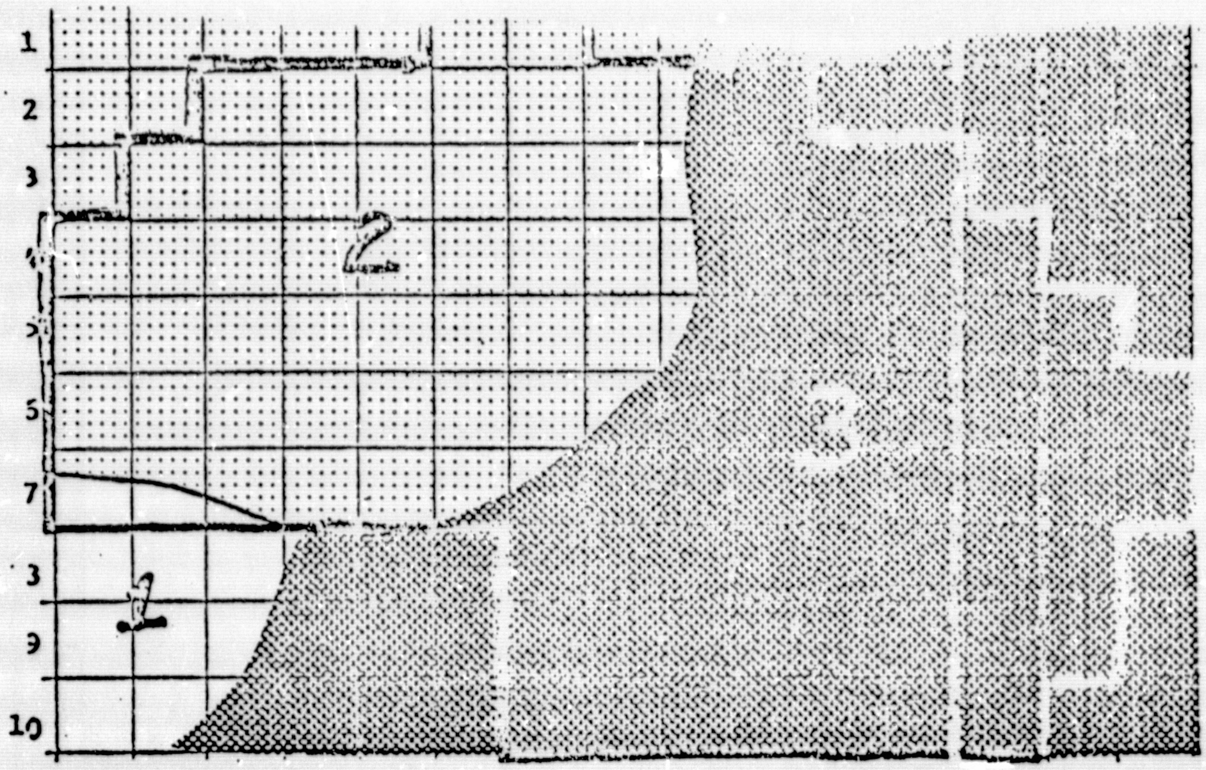



0
1
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2
1 2 3 4 5 6 7 8 9 10 11 12 13 14

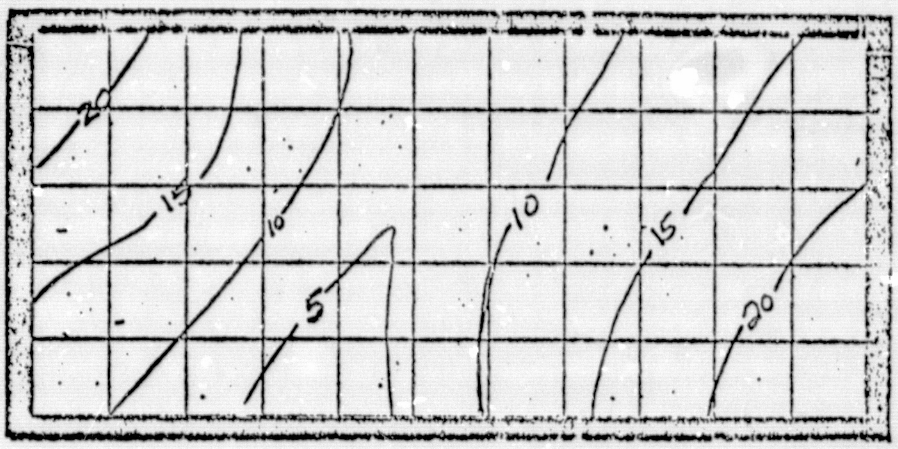
PROJECT	VARIABLE	MISC	CARD NO.

IDENTIFICATION INFORMATION

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0



MAP COLUMN NUMBER	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
CARD COLUMN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1						2	2			3															
2			2	2	2	2	2	2	3	3															
3		2	2	2	2	2	2	2	3	3	3	3													
4	2	2	2	2	2	2	2	2	3	3	3	3	3												
5	2	2	2	2	2	2	2	2	3	3	3	3	3	3											
6	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3										
7	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3										
8							3	3	3	3	3	3	3	3											
9							3	3	3	3	3	3	3	3											
0							3	3	3	3	3	3	3												
etc.																									



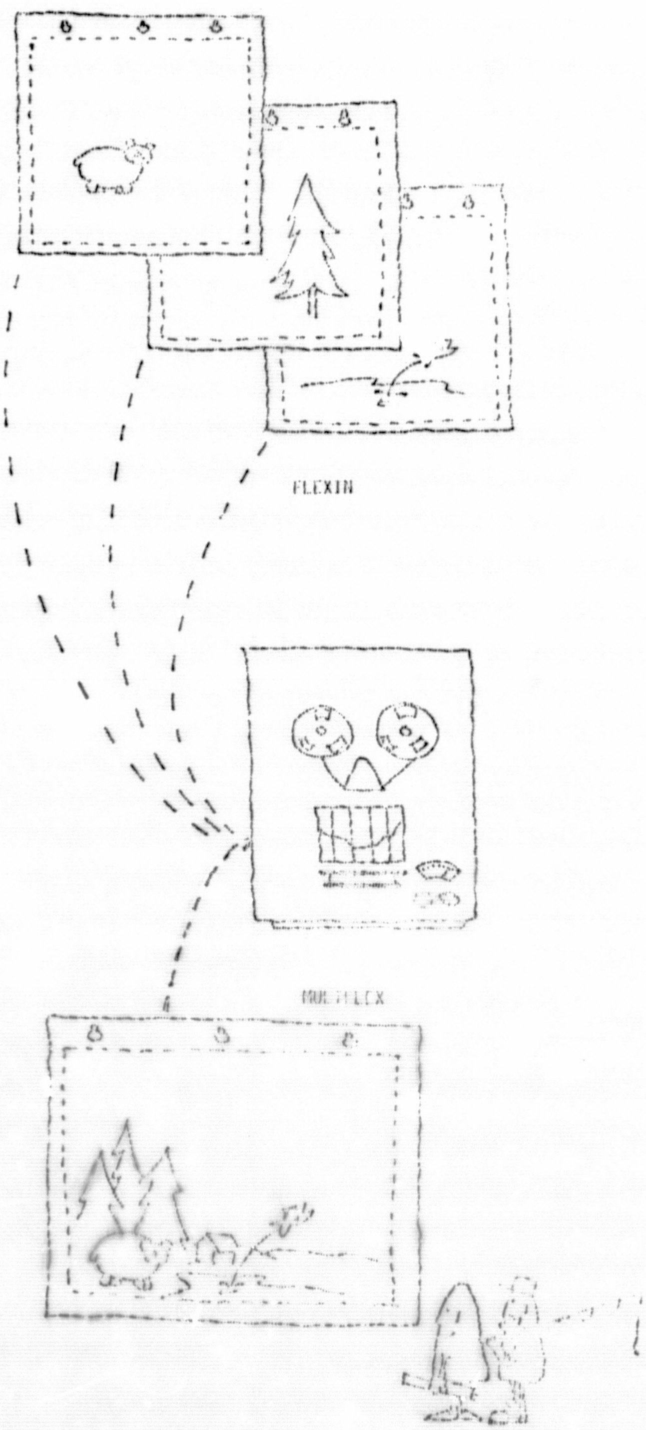
MAP COLUMN NUMBER	1		2		3		4		5		6		7		8		9		0		1		2	
CARD COLUMN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	2	1	1	9	1	6	1	2		9		8		9	1	0	1	3	1	5	1	6		
2																								
3																								

MAP COLUMN NUMBER	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
CARD COLUMN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
						2	2			3															

etc.

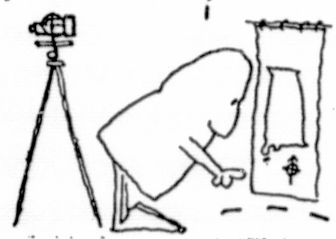
			2	2	2	2	2	2	3	3															

etc.


FLEXIN

A PICTORIAL DESCRIPTION OF ARIS I USE

ARIS user must first select type of data needed to solve a problem.

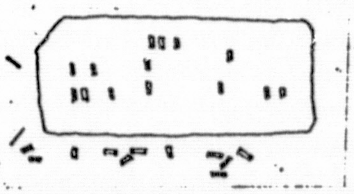


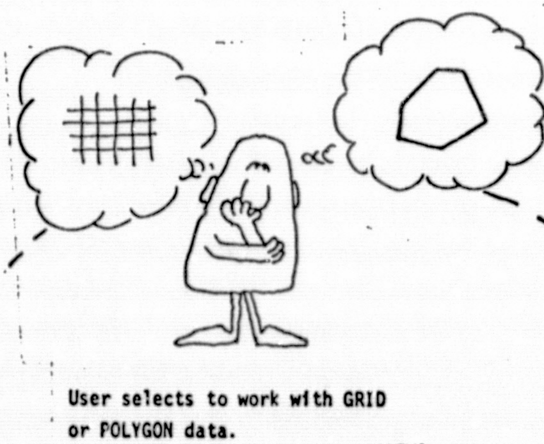
CENSLIST/HOUSLIST

User requires information concerning census population data (CENSLIST) or housing data (HOUSLIST).

ARIS GRID/POLYGON COMPUTER SOFTWARE

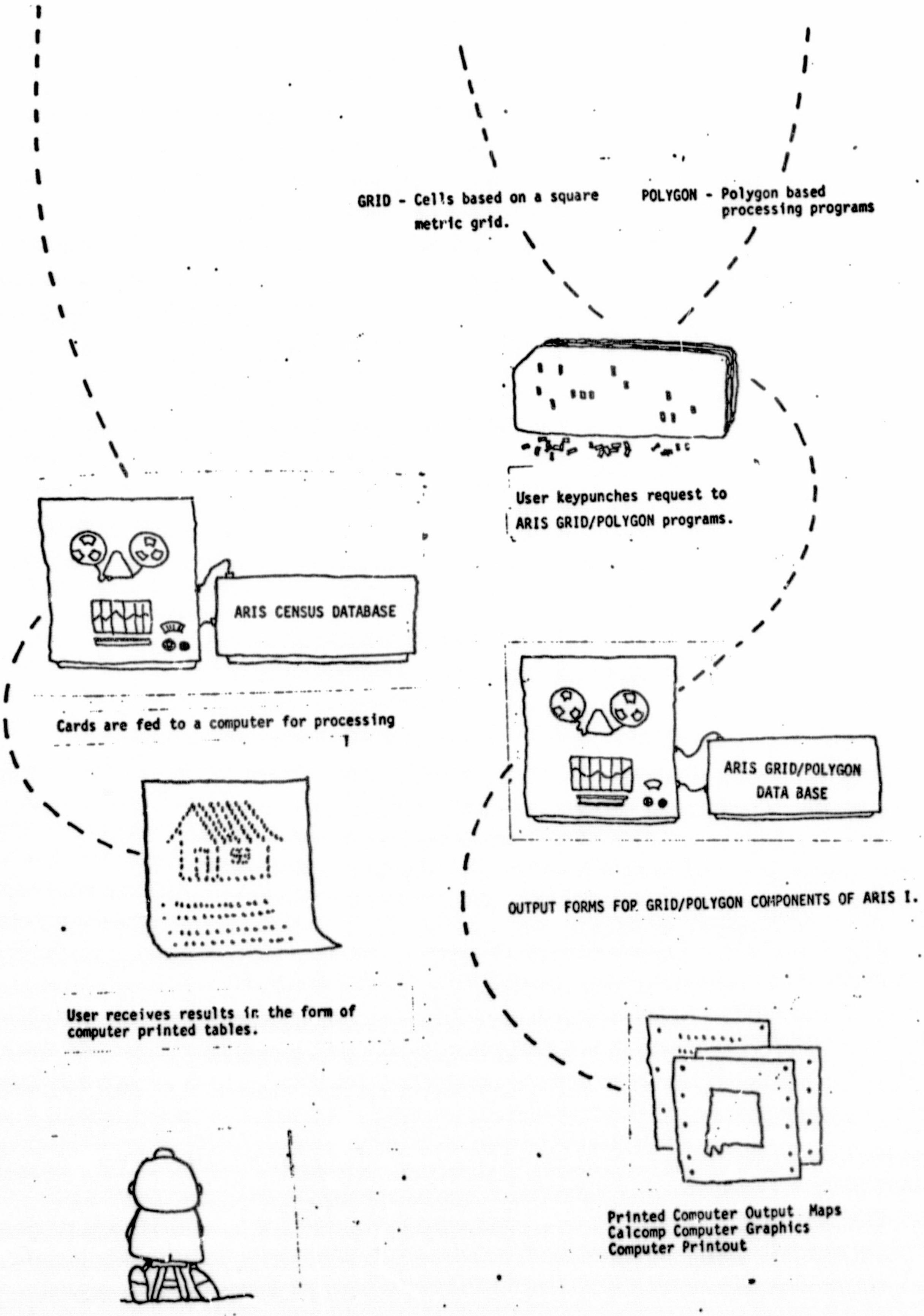
User needs to manipulate geographic data.



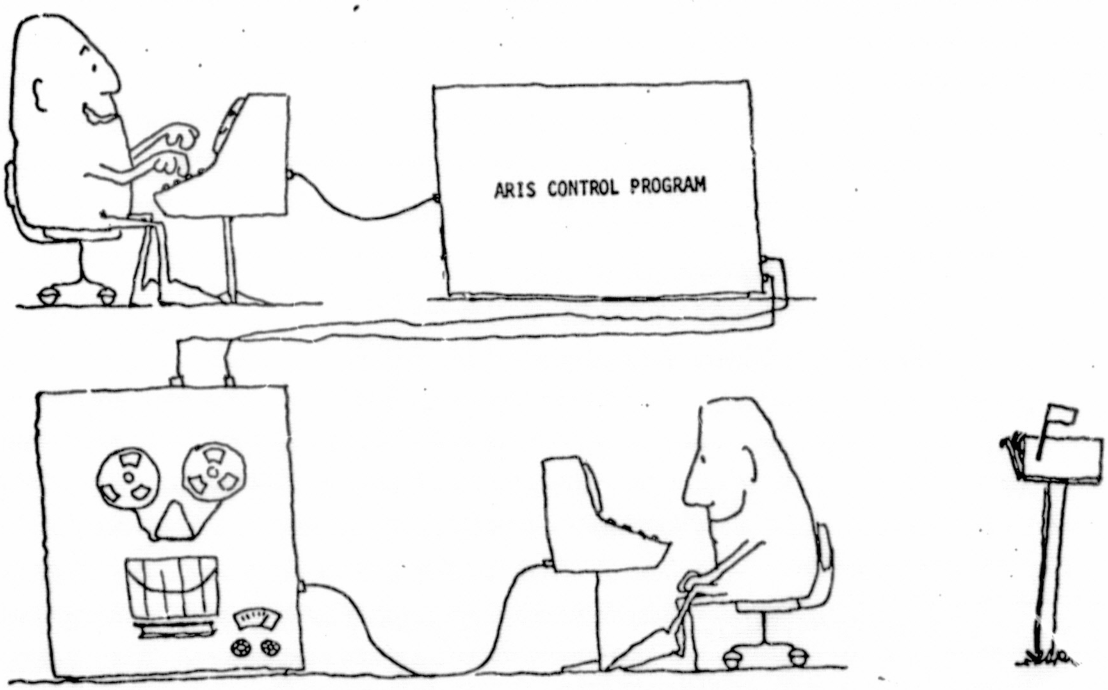


User defines and keypunches a request onto computer cards.

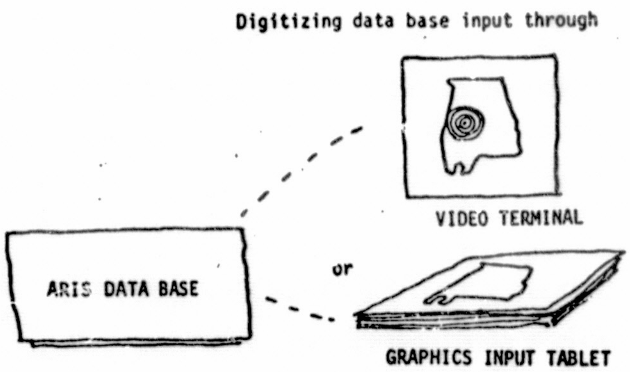
User selects to work with GRID or POLYGON data.

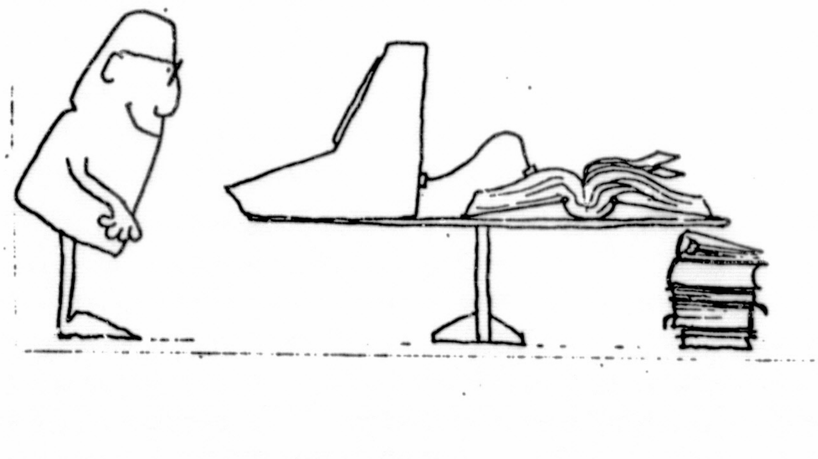

GRID - Cells based on a square metric grid.
POLYGON - Polygon based processing programs
User keypunches request to ARIS GRID/POLYGON programs.
ARIS CENSUS DATABASE
Cards are fed to a computer for processing
ARIS GRID/POLYGON DATA BASE
OUTPUT FORMS FOR GRID/POLYGON COMPONENTS OF ARIS I.
User receives results in the form of computer printed tables.
Printed Computer Output Maps
Calcomp Computer Graphics
Computer Printout

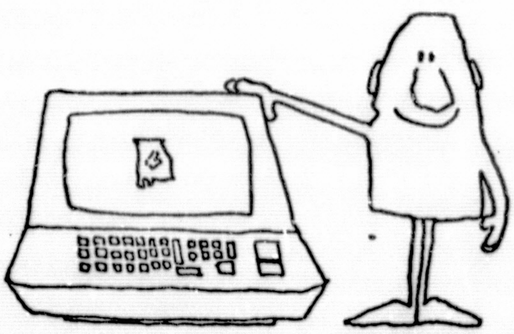
ARIS II



ARIS III


Digitizing data base input through
VIDEO TERMINAL
ARIS DATA BASE
or
GRAPHICS INPUT TABLET





LIST OF PARTICIPANTS

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Dr. Bruce Herring	Karen Winkler
Dr. David Icenogle	G. Barri Wysong

Linda Young